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“Cormorant-fishery conflict management in the Hula Valley, Israel”

INTERCAFE Case Study report, Hula Valley, Israel, January 2006

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**INTERCAFE: *Conserving Biodiversity* -
Interdisciplinary initiative to reduce pan-European cormorant-fisheries
conflicts**

This full report of the INTERCAFE@ Hula Valley Case Study is in 7 parts:

Part (1) Introduction: the development of INTERCAFE and the concept of Case Studies

Part (2) Introduction: the Hula Valley Case Study – orientation and processes

Part (3) Scene-setting: Case Study presentations

Part (4) Case Study synthesis

Part (5) Evening Q&A session with local experts

Part (6) Group work summaries

Part (7) Field Trip report

The Agenda for the 3-day Case Study workshop is given in Appendix (1)

Regular Work Group activities – reports given in Appendix (2)

Israeli participants in the Hula Valley Case Study are listed in Appendix (3)

Part (1) Introduction: the development of INTERCAFE and the concept of Case Studies

(1) The development of INTERCAFE

The EU Framework 5 Concerted Action REDCAFE took a novel interdisciplinary approach to pan-European cormorant-fisheries conflicts by, for the first time, bringing together avian, fisheries and social scientists and many other relevant stakeholders from across the continent and the Middle East to discuss and report on these issues. REDCAFE's full pan-European synthesis and National Overviews for each participating country are available in two reports (Carss 2003, Carss & Marzano 2005, respectively: both are freely available at <http://www.intercafeproject.net>).

The COST Action INTERCAFE uses REDCAFE as a foundation and up-scales this work to become more interdisciplinary by including economists, policy makers and a broader range of social scientists. Moreover, INTERCAFE builds on the information/data synthesis process at the heart of REDCAFE by switching the emphasis of pan-European research coordination to addressing the current and future the needs of local stakeholders and policy makers. This is important because cormorant-fisheries conflicts are a highly relevant environmental issue across Europe, and one that could act as a model for numerous other human:biodiversity conflicts across the continent.

The wide geographic range of European cormorant populations and their wintering migration patterns require investigation and monitoring at the continental scale. Similarly, cormorant conservation legislation is defined at the EU level but implemented nationally or regionally. On the other hand, conflicts with fisheries are regional or site-specific and so management solutions will require implementation at these finer scales. However, due to the migratory behaviour of cormorants, local management strategies could also affect birds at national or continental scales. Thus researchers, policy makers and local stakeholders need to maintain awareness of these scale-dependent inter-relationships.

During the last 20 years, European biological research has clearly contributed much to an improved understanding of cormorant ecology and potential impacts on fisheries and nature conservation interests, at the pan-European scale (see national bibliographies in Carss & Marzano 2005). However, translation of these scientific achievements into quantification of cormorant impact at fisheries and the resolution of cormorant-fisheries conflicts has been limited. Conceptually, one reason for this lack of success is that these conflicts have too often been misunderstood as primarily a biological conservation issue addressed through such documents as The Bonn Convention, The EU Habitats and Birds Directives, the Ramsar Convention and the Convention of Biodiversity. Obviously, future management of European cormorant populations must accommodate the need for the species' long-term survival and be based on sound scientific findings. However, through dialogue with stakeholders, REDCAFE also showed that cormorant-fishery conflicts are an issue of major social, cultural and economic concern across Europe and so these essential non-biological factors must also be taken into account when formulating and implementing practical management policies based on scientific findings. It is evident that technical (scientific) solutions alone are not sufficient for environmental conflicts with social

and economic dimensions. Given that cormorant-fisheries conflicts can be human:wildlife ones, human:human ones or be situated somewhere in between (see Carss 2003: 70-77), research has first to identify the true nature of such conflicts and then look to the most appropriate solutions.

(2) The Case Study concept

Cormorant-fisheries conflicts are a truly pan-European issue being experienced by a variety of stakeholder groups working in a diverse range of aquatic habitats across the continent. An interdisciplinary approach involving the collaboration of biological and social scientific expertise, economic and political interest and practical local experience is now seen as vital to the development and successful implementation of practical cormorant-fisheries conflict resolution strategies across Europe. Furthermore the challenge is to improve information exchange, dialogue, participation and trust between all stakeholders involved in such conflicts.

REDCAFE offered an opportunity to apply recognised conflict management techniques to cormorant-fisheries interactions on a pan-European level. These techniques were also applied to a specific Case Study, that of recreational angling in England (see [3] below, Carss 2003: 131-159). This Case Study was addressed in a workshop designed to give local and national stakeholders and European biological and social scientists the opportunity to share knowledge and experience. Taking this holistic approach highlighted multiple stakeholder perspectives and facilitated a greater understanding of the inter-relationships between stakeholders. Above all, successful conflict management was shown to be dependent on conflicting parties opening communication channels and developing networks of trust for effective collaboration and dialogue. However, there is no formal approach to applying this process to the thousands of other conflict cases across Europe, nor is there clear, coordinated information transfer between all stakeholder groups and few, if any, policy-makers were included in current cormorant-fisheries conflict management processes.

A major aim of INTERCAFE is to promote links between the biological and social science communities, local stakeholders, economists and policy advisors to better understand the role of socio-cultural issues in conflicts, their management within legal frameworks, and efforts towards their resolution. These links are to be forged partly through the interdisciplinary investigation of a series of conflict Case Studies chosen to be 'representative' of cormorant-fisheries conflicts and issues across Europe. Case Study selection takes into account various factors: for example, geographic location, habitat types, stakeholder groups, fishery type, and current and potential mitigation actions.

Case Studies will be investigated through Workshops that concentrate on issues operating at two spatial scales. First, local stakeholders will provide key site-specific inputs providing ecological, social, economic and policy contexts. Second, input from other participants, particularly ecologists and decision makers, will enable all to appreciate the specific Case Study in both national and international contexts. Thus, Workshops will enable all participants to take a 'holistic' view of specific Case Studies. Moreover, Case Studies also offer opportunities to understand conflicts and learn from experiences elsewhere and allow INTERCAFE to disseminate such information as fully as possible across Europe.

(3) REDCAFE's conflict resolution Case Study: the Lea Valley Workshop

REDCAFE analysed a specific Cormorant-fishery conflict case study, in the form of a three-day Workshop designed to give project participants and local stakeholders the opportunity to share their knowledge and experience. The opportunity arose to link REDCAFE to a 'live' conflict case study - that of Cormorants and recreational fisheries in the Lea Valley, Hertfordshire, south-east England. Importantly, selecting the Lea Valley Cormorant-fishery issue as a Case Study also allowed REDCAFE to link with "Fisheries Action Plans", and the UK Government agency-led process being developed to address and prioritise issues affecting inland fisheries at a catchment scale. The REDCAFE case study was placed in perspective through reviews and discussions of values and dialogue in conflict resolution and management, Fisheries Action Plans in the UK, and the Lea Valley case study area. This workshop is reported in detail in REDCAFE's Final Report (Carss 2003: 131-159, also available at <http://www.intercafeproject.net>).

Workshop delegates comprised 36 REDCAFE participants, representing 20 countries, and 16 stakeholders, representing 11 institutions or organisations. Successful conflict management depends on conflicting parties opening communication channels and developing networks of trust for effective collaboration and dialogue. REDCAFE thus worked closely during the Workshop with a facilitator skilled in environmental conflict management. The Workshop began the process of approaching the numerous environmental conflicts apparently affecting the Lea Valley. Although time was short, many important issues were addressed and developed, including conflict management experiences from both continental Europe and the Lea Valley itself.

Several key issues arose from discussions with local stakeholders and these were summarised in an initial 'problem statement' for the Lea Valley. Substantial progress was made in identifying critical scientific and social issues in cormorant/fisheries conflicts. Cormorant-fishery conflicts play a part in the mix of issues facing the Lea Valley but one important outcome of the Workshop was to situate these conflicts in a broader social, economic and ecological context. Local stakeholders made considerable progress where escalating conflicts had become significant obstacles in the Lea Valley. REDCAFE participants had the opportunity to explore part of a conflict management process that related directly to many Cormorant-fishery conflicts across Europe. The Workshop process enabled significant progress to be made in several areas: (a) linking scientific processes and data to real-world social issues, (b) agreeing initial problem statements, stakeholders and needs, (c) identifying relevant agencies, people and pathways for action planning, and (d) identifying research priorities and dissemination actions that link the need for strong, evidence-based scientific knowledge with social and strategic planning needs.

In relation to conflict management experiences from continental Europe, several presentations were given by REDCAFE participants on issues pertinent to the Lea Valley: they described a range of learning from REDCAFE experience and were chosen to be relevant to the Case Study.

The following extract is from REDCAFE's Final Report on the Workshop (Carss 2003: 139, 141):

To many, including some anglers in the UK, the only solution to the 'Cormorant problem' is to kill birds. Such large-scale population culls have also been considered by biologists, both theoretically and in practice. Morten Frederiksen and Thomas Bregnballe discussed the theory of large-scale population control as a tool in Cormorant management (Box 6.1). Thomas Keller discussed relatively large-scale Cormorant culling in practice, based on experiences in Bavaria, southern Germany (Box 6.2). Could lessons be learned from the experience there of seven years of intensive Cormorant shooting? In terms of reducing Cormorant numbers, uncoordinated shooting in Bavaria had failed. However, Tamir Strod and Jonathan Harari described a successful Cormorant management programme in the Hula Valley, Israel where, about 8,000 Cormorants winter and the birds cause major conflicts at fishponds (Box 6.3). Cormorants also pose problems to fishpond aquaculture in Saxony, Germany. Kareen Seiche described an alternative approach to the mitigation of Cormorant damage to fish stocks there (Box 6.4).

In the Hula Valley, Israel, about 8,000 Cormorants winter and the birds cause major conflicts at fishponds. Hundreds of Cormorants have been shot every winter over the past ten years but the problem remains at the same level; shooting is costly and ineffective, it also pollutes the environment (bird carcasses and lead shot). In a collaborative partnership, biologists, fish farmers and NGOs developed a co-operative management scheme for the Hula Valley. On arrival, Cormorants are scared from fishponds, particularly those holding preferred prey *Tilapia* spp., in a co-ordinated manner. Cormorant numbers decline very quickly at fishponds and the programme is effective throughout the winter. As a result of this large-scale, co-ordinated disturbance (with minimum killing), Cormorants are now feeding at less sensitive, alternative foraging sites. As this control programme has developed, operating costs (e.g. staff time, ammunition), numbers of dead Cormorants, and estimated fish losses have all declined. Coupled with the availability of alternative foraging sites for Cormorants, the key to the success of the Hula Valley scheme has been due to:

- Organisation (e.g. interest/expert groups, manpower, resources)
- Information (e.g. Cormorant physiology and ecology, fish stock assessments)
- Timing (e.g. bird migration, co-ordinated scaring)

Box 6.3 Israeli case study: successful Cormorant management.

Thus, for several years REDCAFE and INTERCAFE participants have learned a great deal from discussions and presentations from Israeli colleagues about cormorant-fisheries issues in the Hula Valley. Conflict management strategies there have been presented as a success story, details of which have held appeal for many RED/INTERCAFE researchers and stakeholders involved in these networks.

Naturally, many questions have also been raised about scale, replication, and how to analyse the various technical, social, economic and ecological data that have emerged from the Hula Valley situation. The range of questions and the solution-focussed approach taken by Hula Valley stakeholders suggested that area would provide a basis for a strong INTERCAFE Case Study, enabling analysis of challenging, cross-sectoral issues.

INTERCAFE was thus privileged to be offered the Hula Valley as a Case Study and our Israeli hosts organised a robust and productive workshop for January 21st – 23rd 2006, held at Kibbutz Kfar Blum in the north of the Hula Valley.

References

Carss, D.N. (ed) (2003) Reducing the conflict between Cormorants and fisheries on a pan-European scale REDCAFE: Pan European Overview. Final Report to European Commission, (August 2003), pp169. Also available at: <http://www.intercafeproject.net>

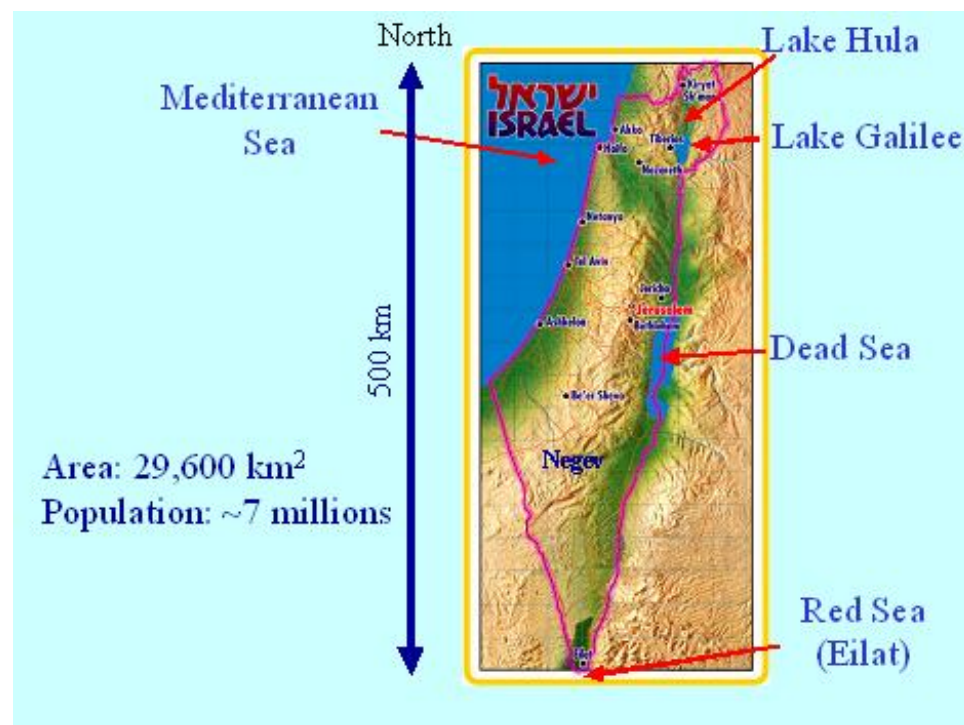
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Part (2) Introduction: the Hula Valley Case Study – orientation and processes

(1) The Case Study area

The following paragraphs, and the four subsections below, were retrieved from http://en.wikipedia.org/wiki/Hulah_Valley [except for texts in square brackets].

The Hula Valley ([see map below] in Hebrew: *Emeq ha-Hulāh*) is an agricultural region in northern Israel with abundant fresh water. Lake Hulah or Lake Hula (the Biblical Lake Merom) and its surrounding swamps were drained in the 1950s as an attempt to alter the environment to suit agricultural needs. Though initially perceived as a great national achievement for the State of Israel, with time it became evident that the benefits from transforming the "wasteland" of Lake Hula and its swamps into agricultural fields were limited.



In the past few years, following nearly 50 years of an unsuccessful struggle to utilize the drained valley's resources, the State of Israel has finally recognized that successful development can endure only if a balanced compromise between nature and development is reached. Thus, a small section of the former lake and swamp region was recently reflooded in an attempt to prevent further soil deterioration and to revive the nearly extinct ecosystem.

Topography

The Hula Valley lies within the northern part of the Syrian-African Rift Valley [see satellite photos below] at an elevation of about 70 metres above sea level. On both sides of the valley are steep slopes - the Golan Heights to the east and the Upper Galilee mountains to the west, rise to 400 to 900 metres above sea level. Basaltic hills

of about 200 metres above sea level along the southern side of the valley intercept the Jordan River, and are commonly referred to as the basalt "plug" (actually a temporary geologic base level), as they restrict water drainage downstream into the Sea of Galilee (Lake Kinneret). The Hula Valley [red arrow on satellite photo below] covers an area of 177 square kilometres (25 km by 6-8 km).



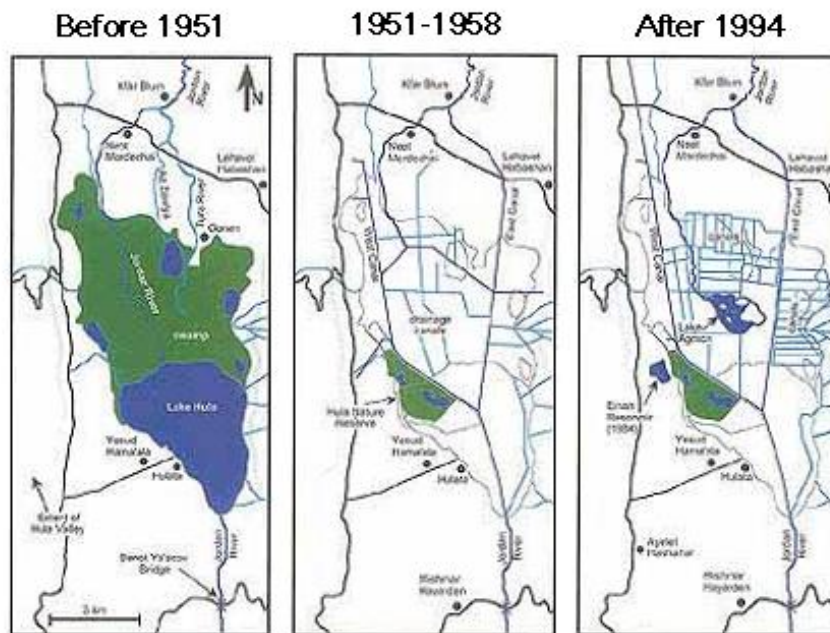
Climate

The climate of the Hula Valley today is Mediterranean, with hot dry summers and cool rainy winters. However, the mountain-enclosed topography of the Hula Valley leads to more extreme seasonal, as well as daily, temperature fluctuations. Annual rainfall varies greatly between different parts of the valley and ranges from about 400 millimetres in the south of the valley, to up to 800 millimetres in the north of the valley. More than 1,500 millimetres of precipitation falls on the Hermon mountain range (mostly in the form of snow), feeding underground springs, including the sources of the Jordan River, all eventually flowing through the valley. The wind regime is dominated by regional patterns in the winter, with occasional strong north-easterly wind storms (in Arabic these storms are called Sharkiyah).

The history of the valley

Prior to its drainage in the 1950s, Lake Hula was 5.3 kilometres long and 4.4 kilometres wide, extending over 12-14 square kilometres. It was about one and a half metres deep in summer and three metres deep in winter. The lake attracted human settlement from early prehistoric times. Paleolithic archaeological remains were found near the Bnot Yaakov ("Daughters of Jacob") bridge at the southern end of the valley. The first permanent settlements, Enan (Mallaha), dating from 9,000-10,000 years ago was discovered in the valley. The Hula Valley was a main junction on the important trade route connecting the large commercial centre of Damascus with the eastern Mediterranean coast and Egypt. During the Bronze Age, the cities of Hazor and Layish were built at key locations on this route approximately 4,000 years ago. Throughout the Hellenistic, Roman, Byzantine and early Arab periods (fourth century

BC to eighth centuries AD) rural settlement in the Hula Valley was uninterrupted. The first modern Jewish settlement in the Hula Valley, Yesod Hamaala on the western shore of the lake, was established in 1883 during the first aliya. In total, by 1948 there were 12 Jewish and 23 Arab settlements in the Hula Valley. Following the establishment of the State of Israel and during the 1948 War of Independence, the Arab inhabitants left the valley, moving to neighbouring Arab countries. Numerous kibbutzim, including Kfar Blum (the location for the Case Study meeting), are in the Hula Valley.



Maps of Lake Hula and Lake Agmon taken from Tamar Zohary & K. David Hambright (http://www.jewishvirtuallibrary.org/jsource/Society_&_Culture/geo/Hula.html).

The drainage of the lake and habitat restoration

The draining operations, carried out by the Jewish National Fund (JNF), began in 1951 and were completed by 1958 [see maps above]. It was achieved by two main engineering operations: The deepening and widening of the Jordan River downstream; and two newly-dug peripheral canals diverting the Jordan at the north of the valley. As concern was voiced by scientists and naturalists who opposed the project because they viewed the swamps as an ecological treasure that must be preserved for future generations, a small (3.50 km²) area of papyrus swampland in the southwest of the valley was set aside and in 1963, became Israel's first nature reserve [see below]. Lake Agmon, located in the southern part of the Hula Valley in the area that once served as the transition between Lake Hula and the surrounding swamps was created in 1994 as part of the rehabilitation program of the valley. This new lake is shallower and much smaller than the original lake. It has an irregular shape, covering an area of one square kilometre with mostly less than one metre depth of water. Several smaller islands were created in the middle of the lake, to provide protected nesting sites for birds.

The Hula Nature Reserve (text from the INPA visitors' pamphlet)

The Hula Valley was at one time the most important resting place for birds migrating from Europe to Africa and back, with tens of thousands of birds making their homes in the lake and wetland here. Many species of rare fish and plants also lived in the Hula Valley, creating a wonderland of flora and fauna. Immediately following the creation of the State of Israel in 1948, the government decided to drain the wetlands and lake (which covered more than 15,000 acres at the time) and convert them into cultivated fields. The task was entrusted to the Jewish National Fund, which began to drain the area in 1951. This was the largest engineering project undertaken by the young state.

Profoundly disturbed by the massive scale of the enterprise, scientists and nature lovers in Israel waged a vigorous battle to conserve at least part of the landscape of the lake and wetland. Although the idea of conserving a swamp sounded rather bizarre in 1951, the Jewish National Fund was convinced of its merit and agreed to set aside 1,075 acres of the lake as a nature reserve. Because of a water shortage, the area slated for conservation was subsequently cut back to 800 acres. These 800 acres became the foundation for the first nature reserve in Israel, which was officially declared in 1964.

Very quickly however, it became apparent that the act of declaring the nature reserve was no guarantee that its world of flora and fauna would remain undisturbed. Water escaped beyond the boundaries of the nature reserve through holes in the lake's dikes, and during the summer, the soil in the reserve dried out almost completely. High-quality water was also difficult to obtain. Agricultural development near the reserve, and the concomitant effects of fertilizers and pesticides also took their toll. As a result of these factors, the flora and fauna of many habitats disappeared from the reserve. It became clear that a major restoration project would be required, and in 1971, the Nature Reserves Authority, now the Israel Nature and Parks Authority (INPA), committed itself to the project. The authority built new dikes, dug a reservoir to collect fresh water, reconstructed the lake and wetlands, and established a network of channels and dams to permit the monitoring of the reserve's water quality and levels.

Water buffalos, which graze on the vegetation and maintain the character of the open meadow, were introduced into the reserve. A trail was constructed in the form of a bridge over the wetland, and lookouts were set up from which visitors could observe the birds. After seven years of preparation, the Hula Nature Reserve was opened to the public in 1978. Some water plants re-established themselves, and over 200 species of waterfowl now flock to the Hula Nature Reserve.

In the spring of 1994, another stage in the campaign to restore the Hula wetland was completed: the flooding of 250 acres of peat soil located some two kilometers north of the reserve. This area would flood during every stormy winter, because the peat soil had sunk below its original level. Allowing the area to flood intentionally improved the quality of water that flows to the Sea of Galilee. Now the water "rests" in the Hula, which allows organic materials that would otherwise flow into the Sea of Galilee and pollute it, the chance to sink. The new pond ("Lake Agmon") has already become an additional body of water for the birds to enjoy as well as a major tourist attraction, and has helped return the Hula Valley to its former status as an important migration and breeding site.

(2) Bird migration and over-wintering in Israel and the Hula Valley

REDCAFE previously explored the issue of Cormorant management on migratory pathways in relation to several European examples (see Carss 2003: 88-92). Israel is well known as a global bottleneck for migrating birds and the International Center for the Study of Bird Migration is located in Latrun, Israel. Birds both pass through Israel and over-winter there in large numbers. Israel's unique location at the junction of three continents, Europe, Asia and Africa, makes it a site for an extraordinary phenomenon: some 500 million migrating birds cross its skies twice a year.



As “*migrating birds know no boundaries*¹”, this can lead to national disputes over their ‘ownership’ in respect of management actions. Trans-national bird migration also means that people must consider issues across a wide range of geographical and spatial scales: from the site-specific to the continental. Moreover (as Carss & Marzano 2005: page *x*) point out,

“... these scales can seldom, if ever, be considered in isolation – they are interconnected in numerous, subtle ways. For example, mitigation actions taken against Cormorants, or changes in the economic value of a particular fishery-type, or the regional interpretation of some piece of relevant legislation in one region/country may have implications and consequences for what happens in another. Even if they do not, there is widespread interest across Europe in what’s happening in relation to Cormorant-fisheries issues. Ultimately, we need to keep one eye on the continental scale (this is clearly a European ‘problem’) and the other on the site-specific level (where conflicts may be best managed).”

¹ Slogan of the International Center for the Study of Bird Migration at Latrun, Israel.



The Hula Valley contains many tens of thousands of birds (see Israel Nature Parks Authority link at <http://www.parks.org.il>). For example, some 45,000 White Pelicans pass through the region before completing their autumn migration to East Africa. Similarly, Great Cormorants that most likely breed in the Ukraine overwinter in the Valley. Their numbers have increased from 59 individuals in 1975 to around 20-30,000 birds today (see Part [3] sections [1] and [5]).

(3) Rationale for Hula Valley Case Study and key issues

The impetus behind conflict management activities in the Hula Valley was the same as for many other fisheries-cormorant conflicts - fisheries stakeholders viewed predation levels on income-generating fish species as being economically unsustainable (see Carss & Marzano 2005). Rising cormorant populations and, in particular, cormorant numbers roosting in the fish farm area were linked to “excessive predation” and “economic damage”, whilst the growing efforts to scare birds away were contributing to increasing time and monetary costs (see for example, Shy *et al.* 2003).

This led to the development and enforcement of an active campaign in the Hula Valley involving dialogue with local stakeholders and scientists. The campaign had three main components:

- The establishment of new ‘alternative’ feeding grounds
- Encouraging birds to move to other ‘alternative’ feeding grounds
- Allowing birds to roost in the Nature Reserve

Many people have hailed the Hula Valley situation as a “success” (see also Part [1] section [3]), and one demonstrating that cooperation between wildlife scientists and fish farmers may be mutually beneficial. One key background issue for the Hula Valley Case Study was thus the concept of devising ‘co-ordinated strategies’ and ‘flexible and adaptive solutions’ for the management of Great Cormorants, given the fact that these are migratory birds unaffected by national boundaries (see above). Israel and the EU are Parties to the AEWA (African-Eurasian Waterbird Agreement <http://www.unep-aewa.org>) under the CMS (Conservation of Migratory Species), and the protection of the Hula falls within this convention and agreement. Another key background issue for the Case Study involved the potential transfer of ‘management’ technology amongst diverse European communities and societies.

The major purposes of the case study were to:

(1) learn about and examine the situation in the Hula Valley as a ‘management programme’ in its own right, and

(2) explore as a group, together with local stakeholders, questions of scale and replication in the light of social, ecological, technical, cultural and political considerations across Israel and at the pan-European level.

(4) Hula Valley Case Study workshop process

The agenda for the three-day Hula Valley Workshop is given as Appendix 1. A list of Israeli participants is given in Appendix 3. The Workshop consisted of four main activities:

(1) A series of eight **scene-setting presentations** with follow-up discussions that (i) helped establish the local and regional context of the Case Study, (ii) provided detailed information on certain aspects of the conflict, and (iii) offered different viewpoints on human-wildlife conflicts and how these might be approached by different stakeholders. These presentations are summarised in Part (3) of this Case Study Report.



(2) **Working sessions** with eight small (n = 7-9 people) groups made up of both INTERCAFE participants and local stakeholders. These work groups met on all three days of the Workshop and their general Terms of Reference throughout were to discuss and explore:

(A) Stakeholder analysis and conflict management process

- (a) The stakeholder community, and their needs and interests.**
- (b) The outcomes of the Hula Valley management programme and the processes leading to it, specifically (i) what worked well and could be recommended to others and (ii) what should others be recommended *not* to do?**

(B) ‘Technology transfer’ within Israel and internationally



- (c) The barriers and opportunities for ‘exporting the Hula Valley “success” elsewhere in Israel.**
- (d) What contribution can the Hula Valley experience make to policy development outside Israel at the international level?**

A synthesis of these working sessions is given in Part (4) of this Case Study Report, whilst individual reports from each of the eight groups are given in Part (6)

(3) Informal **Question and Answer session** between local stakeholders and INTERCAFE participants during the evening meal on Day Two of the Workshop. A transcript of this session is given in Part (5) of this Case Study Report, whilst key messages from it are incorporated into the Workshop synthesis provided in Part (4).

(4) **Field visits** and field-based presentations from key experts were provided on Day Two of the Workshop. A report of the field trip is given in Part (7) of this Case Study Report.



Ideas and writing from all four of these activities - but particularly from the eight small work groups - were drawn together in working sessions on the final day of the Workshop and summarised by lead facilitators in each of the eight smaller working groups. Additionally, several INTERCAFE participants contributed further summary material after returning home and reflecting on the Workshop. As well as being offered separately (Parts 3,5,6,7), all these outputs have been drawn together and synthesised for this Report (Part 4).

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Carss, D.N. (ed) (2003) Reducing the conflict between Cormorants and fisheries on a pan-European scale REDCAFE: Pan European Overview. Final Report to European Commission, (August 2003), pp169. Also available at: <http://www.intercafeproject.net>

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Keller, T.M. & Carss, D.N. (eds) *Cormorants: Ecology & Management*. Die Vogelwelt 124, Suppl.

Part (3) Scene-setting: Case Study presentations

INTERCAFE participants and local experts heard a series of eight 'scene-setting' presentations, starting with (1) an introduction to the ecology of birds in Israel. This was followed by four presentations (2-5) focussing on conflicts with birds both at the national level in Israel and, more specifically, in relation to the Hula Valley. The final presentations considered (6) the reporting of human:wildlife conflicts in the media, (7) the economic value of wildlife and its role in human:wildlife conflicts, and (8) the role of basic science in conflict management.

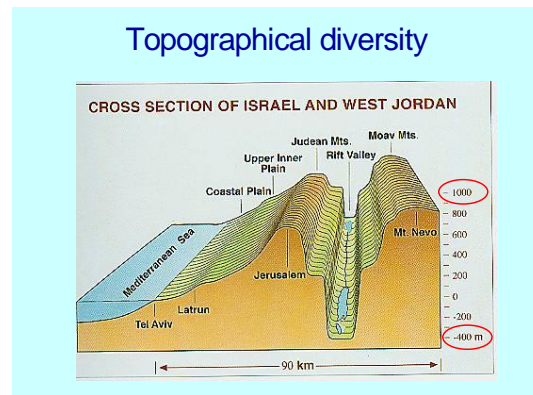
(1) Avian ecology in Israel: an overview

Ido Izhaki, Department of Biology, University of Haifa at Oranim, 36006 Tivon, Israel.



Although Israel is a small country (29,600 km²) its bird (and other biota) richness is remarkably high with a total of 511 bird species. The number of birds per 1,000 km² in Israel (17.3) is much higher than in other European countries (e.g. England = 2.00, Germany = 0.73). There are three non-exclusive explanations for such high biodiversity: (1) Israel is a junction of three biogeographical units, between the Mediterranean Sea and the Arabian Desert

(see picture left), (2) Israel is characterized by high diversity of habitats (due to great diversity of topography, soils, and climate – see picture below right), (3) Israel is within an important migration route between Europe and western Asia to Africa and back (see Part [2]).



Before 1951, altogether, the Hula lake and swamps covered up to 60 square



kilometres that supported a diverse variety of animal life. The Lake Hula area probably contained the richest diversity of aquatic biota in the Levant. Most of this area was drained between 1951 and 1958 as a national project aimed to increase the amount of arable and grazeable land and to eradicate malaria. However the drainage had devastating consequences including a dramatic reduction in wildlife diversity

(see picture below). In the beginning of the 1990's a re-flooding project was initiated, including the establishment of a new small lake (Lake Agmon). There were immediate positive outcomes of the re-flooding such as re-establishment of many plant species, massive flocks of migratory pelicans, storks, cormorants, cranes, and

other birds en route between Europe and Africa, stopped over days to weeks in the vicinity of Lake Agmon and huge number of birds wintered in the vicinity of Lake Agmon. Because aquaculture and agriculture are highly developed in the Hula Valley, the presence of high numbers of birds, some of which feed on crops and fish, create intensive man-bird conflicts. Some of these conflicts are explored in more detail in the following presentations.

(2) The Israeli Fisheries and their conflict with Cormorants

Dan Mires, Former Director of the Department of Fisheries and Aquaculture, Kibbutz Ein Hamifratz Doar Na Ashrat 25210, Israel

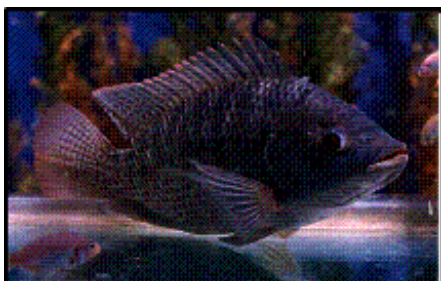
Israeli fish production derives from: (1) inland aquaculture (18,949 metric tonnes), mariculture (3,353 tonnes), Ornamental fish (9.8 million US\$), and Lake Kinneret (the Sea of Galilee) (1,137 tonnes). Carps and tilapia are the main cultured species, followed by mullet, Chinese carps and others (including trout, bass, red drum, barramundi, eel and others). Around 50% of the fish consumed in Israel derive from national aquaculture.



Production systems in inland aquaculture include conventional earthen ponds, dual purpose reservoirs utilized for both irrigation and fish culture, reservoir dependent systems that recirculate water from reservoirs to hard-bottomed intensive ponds and closed water systems. Water sources are limited and thus valuable and expensive. The total water area of inland fisheries (excluding ornamentals and mariculture) covers 2,900 ha. Eighteen to 24 months are required to finalize a culture cycle from fry to market sized fish. Fish growth is temperature-dependent and lasts for only 7-8 summer months. Hence, during the 4-5 winter months, marketable fish and fingerlings are stored in heavily stocked ponds. Fish densities are approximately 5,000 kg/ha in summer ponds, 2-3,000 kg/ha in winter storage and 3.5



kg/ha in Lake Kinneret. Out of the 50 million fingerlings that winter in fishponds some 38 million are stored in the Eastern Valleys, 8.1 million in the coastal area (including the Bay of Haifa) and only 1.8 million in the Upper Galilee (Hula Valley) that borders with the Hula Nature Reserve.



Pelican and cormorant migration concur with the winter fish storage period. The first feed on larger fish and the latter on fingerlings. The Great Cormorants have established an ever-growing number of roosting sites at flying distances from fish farms and Lake Kinneret and the Pygmy Cormorants have established new breeding sites in several areas. The direct fish loss from cormorants is staggering. In spite of the imposed restriction on the fishing efforts in Lake Kinneret,

the total catches from 1999 to 2004 dropped by ca. 50%. Concurrently, the numbers of great cormorants have grown exponentially and average now 20-30,000 individuals. Considering that these birds consume some 0.3 kg of fish per day and their stay in Israel exceeds 100 days, the estimated total annual fingerling consumption from inland fisheries ranges from 800-1000 tonnes. Based on very conservative estimates, the annual direct economic loss to fish-growers, exceeds 5.1 million US\$ repartitioned as follows: Direct predation (\$3 million), patrol and deterring equipment (\$1.6 million) and summer predation by pigmy cormorants (\$0.5 million). The loss of fingerlings has a critical effect on production. The price increase due to cormorant predation and cormorant patrolling equals 0.27\$/kg of fish.



Great cormorant populations, in general, are not endangered. The factors that caused the enormous enhancement of the cormorant populations, their invasion into more and more territories are a consequence of **man made policies and chosen priorities** that today undermine the livelihood of fish-growers. These should therefore be **reversed** by allowing a monitored reduction of cormorant populations to a point that is manageable. The REDCAFE reports (Carss 2003, Carss & Marzano 2005) cover almost every aspect of the cormorant-stakeholder conflicts. The reduction of these conflicts does not require further research. Instead, time has now come for INTERCAFE to present clear-cut statements upon which policymakers can plan and implement measures capable of establishing an acceptable co-habitation between all stakeholders and the cormorants.

(3) Managing wildlife-human conflicts in Israel: the Hula Valley as a case study

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Israel has an especially high level potential for wildlife-human conflicts due to a variety factors: a dense human population in a small country; a high diversity of wildlife species, strict wildlife protection laws, and low hunting pressure. INPA's philosophy for dealing with wildlife-human conflicts is proactive, and is based mainly on encouragement of the use of non-lethal methods to prevent conflicts (see picture left), but allowing for lethal control for population management of exploding species or invasive species.²

² Nemtsov, S.C. 2002. "Management of wildlife-human conflicts in Israel: a wide variety of vertebrate pest problems in a difficult and compact environment". In: R.M. Timm & R.H. Schmidt (eds) *Proceedings of the 20th Vertebrate Pest Conference*, Davis, University of California, pp.348-353.

A number of cooperative programs in Israel that involve multiple stakeholders (see picture below), have led to successful programs for regional management of conflicts in a number of areas, such as wolves vs. livestock in the Golan Heights, migrating birds vs. aircraft, ground-nesting birds in airbases, crows vs. summer field crops, Eurasian cranes vs. winter field crops in the Hula Valley.

An overview of the Hula Valley as a case study, showed that the major stakeholders involved in the area are: the fish-farms, which are kibbutz-owned; the Northern Galilee Regional Council: local government (and their Farmers' Association representing the agricultural sector); the SPNI (Society for Protection of Nature in Israel): Pro-wildlife NGO; the INPA: Government wildlife agency (which also manages the Hula Nature Reserve); the Jewish National Fund (JNF-KKL): a quasi-government land management agency that manages the Agmon Hula Restoration Project and the Eurasian Crane ecotourism project; the Ministry of Agriculture: Department of Fisheries; Academia: Technion U., Haifa U., Tel Hai College, Tel Aviv University.

Cooperative resolution of waterfowl-fisheries conflicts in the Hula Valley is aimed at five main species: great cormorants (*Phalacrocorax carbo*), pygmy cormorants (*P. pygmeus*), white pelicans (*Pelecanus onocrotalus*), little egrets (*Egretta garzetta*), and night herons (*Nycticorax nycticorax*).



The resolution of conflicts in the Hula valley is distributed among the different stakeholders: The fishermen: Financing; coordinated scaring; overhead netting (see picture below); shooting; SPNI: Monitoring; coordination of conflict resolution; Local government: Program coordination; INPA: Permits; monitoring; research; Academia: Research; Ministry of Agriculture: Advise; *Joint*: Trash fish feeding (mainly for pelicans) in the Hula Nature Reserve and the Lake Agmon restoration project.

The piscivorous bird-fisheries conflict in the Hula Valley is managed by cooperation among the various stakeholders, mainly by non-lethal scaring of cormorants to induce them to feed in the Lake Kinneret area and providing alternative feeding of trash fish for the migrating pelicans. But most fish-farmers avoid conflict with these species by not raising fish in the Hula Valley in winter.



In conclusion, the Hula Valley is an excellent example of multiple stakeholder cooperation in the resolution of a case of wildlife-human conflict, in the Eurasian Crane project at Lake Agmon. The degree of success of the resolution of the cormorant-fisheries problem in the Hula Valley is debatable, depending on one's definition of success.

(4) The conflict with cormorants and pelicans in the Hula Valley

Amnon Nir, Northern Galilee Agriculture Association, Northern Galilee Regional Council, Kiryat Shemona, Israel.

Whilst agreeing with the costs, expenses and damage to fish outlined in a previous presentation (2), there is a different situation in northern Galilee where the Hula Nature Reserve in the middle of the area offers shelter and refuge to cormorants and pelicans. Pygmy cormorants and pelicans were very common in the Hula Valley up to the early 1950s but disappeared a short time after the drainage of the Hula Lake. Consequently, the fish growers did not have any conflict with those species during the late fifties and up to the late eighties, when pelicans came back to the Valley on their way to Africa during the autumns. The conflict with pelicans was usually treated violently because no other way was suggested, and later on, when the conflict with increasing numbers of cormorants had developed, during the nineties, the same techniques were taken, namely – shooting at the birds to deter or to kill.

Nevertheless, the Great Cormorants wintering population in the Hula Valley increased consistently and the losses of small fish (the stock for the next generation) became significant and too heavy to ignore.



During the late nineties, we tried to use an alternative feeding strategy for the pelicans, using non-commercial fish (wild spawning of *Tilapia zillii*), as suggested by the biologist of the Hula Reserve and, it was helpful. The conflict with the cormorants seemed to be different so, we shot to kill, although it didn't solve the problem at all.

In 2001 we decided to cooperate with the Hula Reserve team to avoid the killing of cormorants and to shift to non-lethal deterrence of cormorants with full cooperation and data sharing with that team, including reorganized alternative feeding for the pelicans during autumn.

After the 3 year project, we realized that this management technique is successful and all the fish growers in the area intend to keep it going. Today 1,000 – 1500 cormorants stay in the area although they do not rest at the fish farms anymore. Around 300 cormorants enter the farms every morning but due to the immediate use of flares and fireworks these birds are directed towards Lake Kinneret. Thus the damages have been significantly reduced, down to a minimal and tolerable level, while the annual expenses to handle the conflict with fish eating birds dropped from 350,000 NIS down to about 60,000 only. Most of the fish growers appreciate the surrounding nature and prefer to keep using “green” techniques for managing birds-fishery conflicts. However, the Pygmy Cormorant is now also emerging as a ‘conflict issue’ in the area. Furthermore, although to many “the local problem is solved”, the Bet She’an fishermen (to the south of Lake Kinneret) disagree with this opinion.

(5) Wintering cormorants & migrating and wintering pelicans in Israel in recent years: trends, conflicts, conservation & solutions

Ohad Hatzofe & Yifat Davidson, Science Division, Israel Nature and Parks Authority, 3 Am Veolamo Street, Jerusalem 95463, Israel.

Israel is the 'bottleneck' for the West Palearctic's populations of White Pelicans during their autumn migration (also see Part 2): about 45,000 birds migrate each year. These figures are higher than the estimated population of S.E. Europe and W. Asia (33,000-20,000 individuals with -6,700 11,000 pairs). Earlier research in Israel had found that the stop over in Israel for feeding for part of the migrating Pelicans is energetically critical for their physiological condition and thus, for completing their migration to East Africa over large surface without available food source. That means that any measures taken in Israel, in order to reduce the conflict with the inland fisheries, might affect the West Palearctic populations.



In order to ease the pressure of migrating Pelicans on the Hula valley fisheries, since the early 1990's non-commercial fish are supplied for migrating Pelicans in the Hula N.R. and in the re-flooded lake. These measures, together with coordinated guard in fisheries (fire-works, shooting to scare), had reduced the conflict dramatically for the benefit of all: Pelicans and fishermen. Conflicts arise mainly when there's a shortage in non-commercial fish (all fish produced, except some ornamental species which are exported, are for local markets).

These measures had probably led to the decrease in number of over-wintering Pelicans in Israel: from about 2,000 to ca. 300 individuals each year, due to their better physical condition which prevent their weakness and inability to continue their migration.

This year we implemented a "feeding restaurant" method (an alternative foraging site maintained with stocked fish) on the Pelican's coastal route. Pelicans have always stopped over at the Hula Valley during the annual migration to Africa but since 1952 this crucial 'replenishing' stopover has vanished due to human activity. Thus there is a vital need to provide a sufficient alternative for ensuring that the Pelicans survive. The feeding restaurant seems effective but too early to detect its influence on the wintering population size and the effect on nearby fisheries.

During the last quarter of the 20th century, the wintering population of the Great Cormorant in Israel had increased dramatically (up to 3-4 fold). While in 1975 only 59 Great Cormorants were counted in Israel, the wintering population today is estimated at about 25,000-30,000 individuals.

Traditionally, this population wintered in a few large water bodies in northern Israel. The population has expanded its distribution to new water bodies in all parts of the

country (up to 400 km apart), even in water-bodies in the extreme desert (<50 mm annual precipitation). The water bodies occupied in recent years are diverse both in size and function, and include rivers, reservoirs, fish ponds, a city park's lake, and the Mediterranean and Red Sea shores. The day-roosting sites are also quite diverse, and there are Great Cormorants that roost even in urban areas. In many instances, the public are 'voting with their feet', there are some ecotourism businesses offering visits to roost sites and free guides are available here. Public opinion on these issues should not be forgotten.

We are engaged in monitoring, management and research, to estimate Great Cormorant damage to freshwater fisheries, and to study their behaviour at wintering sites. In addition we are experimenting with practical methods, such as laser guns or



"fish refuge cages" in order to regulate their distribution within the country and to reduce conflict with the fisheries. Laser guns are very efficient on roosts, the birds being driven to Lake Kinneret. Here they feed on Kinneret Bleak (or Lavnun Ha'Kinneret *Acanthobrama terraesanctae*), a fish species

removed by fishermen in an attempt to increase water quality (transparency) in the lake. This is a small (< 25cm) subtropical Cyprinid distributed across Asia but endemic to Lake Kinneret. The species lives near the surface in large schools, with occasional forays to deeper waters, it spawns in November to March and its diet is limited to zooplankton. A USDA publication (use of lasers in animal dispersal) recommends starting dispersal early in the season in order not to let the birds settle for winter. Conservation of natural stocks of freshwater fish is under the sole jurisdiction of the Ministry of Agriculture, and no freshwater fish are classified as protected wildlife. However, freshwater fish that live in Nature Reserves are protected and cannot be exploited by fishing. Since no freshwater fisheries in Israel occur in Nature Reserves, all freshwater fish stocks remain available for waterfowl only so there is no conflict with fishermen.

The Israeli Great Cormorant population nests, most probably, in the Ukraine, as all rings recoveries (n = 45) were from there. Naturally, this has management implications that call for collaboration between the two countries.

(6) Using communication media

Zafir Rinat, Ha'Aretz Newspaper, Tel Aviv

Two specific human:wildlife conflicts exposed by the Israeli media became headline news. The first involved the poisoning of griffon vultures in the Golan Heights. Here, farmers had instigated an illegal wolf poisoning programme but many vultures were accidentally poisoned. This news was very dramatic and exposed to the wider public the conflict occurring between cattle farmers and the wild carnivores. The second case emerged 6-7 years ago between fish farmers in the Gulf of Aqaba and scientists. A very large group of scientists wrote a document stating that fish farms in the Gulf

were damaging the local coral reef system and that fish cages should be removed from the water. This was, perhaps unusually, a very clear and explicit statement by the scientists. The Government decided to close down the farms gradually over a 3-4 year period and put an end to the issue. However, the process of fish farm abandonment is still not finished and no one is quite sure how it will end. These two conflicts highlighted all sorts of associated political and social issues and exposed numerous different perspectives – from the individual upwards. However, the central point in each was a scientific issue that was brought to the public.

Given that scientific information is so often seen as the main issue in such human:wildlife conflicts, the key question is “how can journalists take this scientific information and make a clear assessment of it?” This is problematic for journalists who often find that scientists are unwilling to talk out about these issues for two important reasons. First, they are often reluctant to give out their scientific data (associated with this, some may also feel the quality of scientific reporting in the media is poor). Second, they always avoid saying anything controversial, they do not take risks and are concerned over the misinterpretation of their findings. Nevertheless, most scientists are funded through public money and so they should share their findings – they have a choice: either through PR or by talking to the media directly. In this context, the Gulf of Aqaba case mentioned earlier was very interesting. Here, scientists were very blunt and put forward a very definite case against the fish farms. Both scientists and fish farmers used the media to try and get their messages across.

Despite the ‘clarity’ of opposing views over the Gulf of Aqaba case expressed in the media, most situations are more complicated and scientists are less willing to use the media or become involved in it. However, scientists should seek ways of communicating with the press – the clearer and simpler their message, the less room for mistakes. Scientists should initiate contact with the media (not the other way around), especially if they are working for a governmental organisation. Similarly, scientists should meet journalists before any conflict becomes established. One important aspect that journalists need to understand is the context within which scientists are ‘speaking’. For example, scientists say - in relation to wolf control – that a large number of wolves could be killed without putting the population at risk of extinction. This is an interesting point and one still much debated. It highlights that the context of a ‘story’ is very important – for example the moral context of whether or not wolf numbers should be controlled and the scientific context of the likely effects of such control on wolf populations. Only when journalists have help from scientists to understand the various points of view can they report on how ‘important’ the issue is and also report it with appropriate knowledge. A good example of how confused journalists get involves an environmental conflict surrounding water management in a river catchment in the USA. Ultimately, one journalist encapsulated the situation in the following quote:

“Nothing is clear but everything is interconnected.”

However, journalists do need to try and get to a clear message or point of information. They may sometimes complain about the numerous aspects of a complex issue and try to simplify things, to think in black and white, and talk of conflicting ‘sides’. However, ‘simplicity’ is often the enemy of truth, so journalists need to work hard to produce simple, clear but accurate articles. Journalists ultimately need to know how

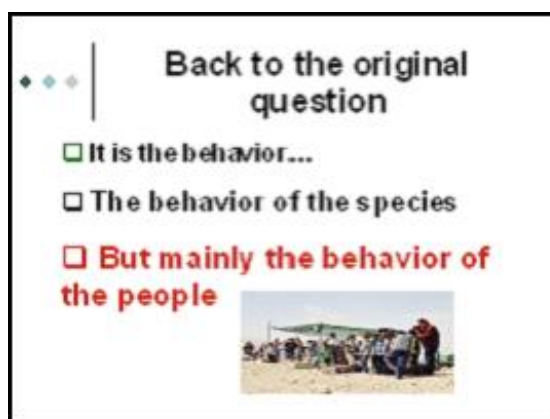
important an issue is. In the case of cormorants and fisheries in Israel, this has been seen mostly as a debate between the Nature Reserves Authority and local fishermen. It has been considered as a 'local' issue and so has not been covered too much by the media. This probably reflects the reality of the situation – journalists write about issues that they receive complaints about: people need to feed the media with ideas and issues. Personally, I have seen a need to elaborate on the Israeli cormorant-fishery issue and to continue reporting on it. Going back to the Gulf of Aqaba case, the debate was around two opposing points: the preservation of the ecosystem versus the fact that fish farms were one of the few economic earners in the area. The Government has discussed this specific issue around 5-6 times, it is under pressure from all sides and it is not sure what to do. So the story continues, and continues to interest the media.

Another very important point to consider is an understanding of the context of agriculture in Israel. Given the environmental history of the country, many natural resources are no longer 'natural' but they may still be important sources of biodiversity. However there is also an important psychological issue here. The state of mind of many people is that "agriculture is under pressure(s)". The media should therefore be clear that 'we' as a society (through the Government) have to help farmers do everything that INPA tells them to do. In the case of the cormorant issue, and many others, it is important to remember that ecosystems belong to the public and not to a particular individual. The media should point out that there should be no killing of birds without permission – there should be no law breaking – but also highlight that because cormorants are part of the current Israeli ecosystem, then the government should therefore pay out compensation to help farmers coexist with the birds.

(7) Economic aspects of human:wildlife conflicts

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Objective articles that cover the whole issue in the media (as described in [6]) are a very good start. However, one problem is that we don't know the 'answer' until we've finished the scientific research. Thus, conflicts between humans and wildlife invariably give rise to decisions among competing alternatives. Economics tries to choose between alternatives in such a way that some social function would be maximized.



The arguments in this function do not include the welfare of wildlife explicitly, rather they consider the welfare (or sometimes referred to as "benefits") of humans who get some satisfaction from wildlife. Therefore, it is more of a human:human conflict than a human:wildlife conflict (see Carss 2003: 73-77).

In order to choose among different alternatives, one has to measure the benefits and costs to society by choosing between them. Unfortunately, estimating the benefits from protecting wildlife is not as trivial as the alternative (e.g., fishing or agricultural

activities). Therefore, special techniques were developed in order to measure these benefits.

Three case studies are discussed: waterfowl in the Beit-Shean fish ponds, cranes in the Hula valley, and the national program to protect griffon vultures.

It was found that in the case of the Beit Shean fish ponds, the most preferred option for the fishermen is active protection measures, which cost 1.5 million NIS annually. If the social value of the waterfowl is taken into account, the preferred option is minor (passive) protection measures. However, that would cost 5 million NIS to the fishermen. There needs to be some negotiation with the fishermen in order for them to accept it.



In the case of the cranes in the Hula valley it was found that an alternative feeding program costs about 0.75 million NIS annually. This falls partly on the farmers. Revenues from the commercial side are estimated to be about 1 million NIS. The

social value of the site is estimated to be about 16 million NIS. Again, without some kind of settlement with the farmers, the program won't hold despite its relative benefit vs. other programs.

Finally, the vulture protection program was found to cost about 26,000 NIS per protected vulture. The social value of vultures was found to be 34,000 NIS. There is no conflict in this case between farmers and nature lovers. The conflict is with the general budget allocation priorities. It was shown that protecting vultures currently passes a cost benefit test with a cost benefit ratio of 1.31 and therefore, the general budget should be allocated to that purpose.

Without understanding human behaviour towards wildlife protection on one hand, and towards the market value of lost agricultural activities or increased costs for farmers on the other hand, we are missing the potential to analyze the given options on educated and logical grounds. More work is needed on connecting human – wildlife interaction in order to avoid the conflicts.

(8) The role of basic science in conflict management

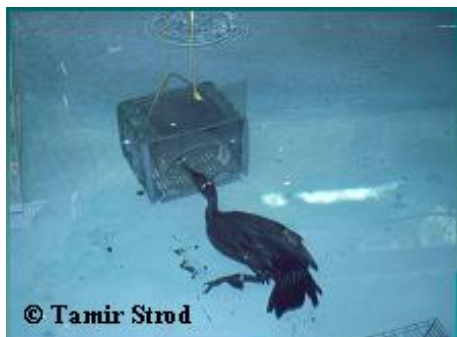
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The deterioration of wetlands as a result of global climate changes, industrial and agricultural development, and habitat fractionation render long-distance migrating birds face difficulties in finding proper sites for rest and re-fueling. In Israel, which is a bottleneck for 600 hundred million migrating birds, the drainage of the Hula Lake in

the 1950s resulted in serious conflicts between water birds and the intensive fisheries and agriculture.

Implementation of various deterrence methods, including shooting to kill, failed to solve these conflicts.



As experimental scientists, we have offered the concept that only the understanding of the biology of the organism in question may give us the tools (indications) for a proper management that will solve such conflicts while helping the preservation of natural assets such as wetlands and their inhabitants. We demonstrate this in the solutions reached in the case studies of pelicans and cormorants.

We have studied cormorant's and pelican's physiological condition, food preference and energy demands, and their behavioral and ecological constraints. As a result, we were able to offer differential, biologically based, non-lethal management solutions that are currently implemented with the full cooperation of the fishermen and the nature preservation authorities. We have shown that such solutions are economically helpful for fishermen, environmentally friendly, and enable the preservation of the wetland habitat and its inhabitants.



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Part (4) Case Study synthesis

(1) Background to the Hula Valley and areas of concern

While the initial driver for the case study was the local approach to conflict management, the issues to do with ‘unsustainable predation’ also sit in a wider context in Upper Galilee and beyond.

The Hula Valley is situated in Upper Galilee Region and has a climate that varies from Mediterranean to “semi-tropical.” In support of agricultural expansion, drainage of the swampy valley lasted from 1951 to 1959. In 1963 the nature reserve and the Society for Protection of Nature in Israel were founded and the valley was re-flooded from 1990 to 1994. The SPNI is an NGO that began life working in education and doing many field trips. Other agencies involved in nature protection include The Ministry of Environment and INPA (Israel Nature Protection Agency), which provides scientifically based management advice and whose rangers enforce nature protection laws.

Although the upper reaches of the River Jordan flow through the valley, water remains a scarce resource and biodiversity in fresh-water resources is low, with only a few native species; most species have been introduced. Drainage of the valley has led to one endemic fish species becoming extinct and also the loss of other species from the area, such as Tilapia. There also are many introduced species in the valley’s flora. In contrast, avian biodiversity is high - around 250 native bird species (plus many hundreds more species on migration, see below).

While the overall unemployment rate in Israel is currently around 8%, it is apparently lower in the Hula Valley. Although there have been changes in the Kibbutz structure, there still are no labour shortages in the area. The kibbutz movement began in the early 20th century with a cooperative communal system based on agriculture, with total equality for all members. In the modern kibbutz of the 21st century, agriculture is only rarely the major source of income, and privatization has led to a system of differential salaries and benefits for members, with many preferring to employ cheap labour. These changes have made most kibbutzim more lucrative and better competitors on a national scale, but have changed the internal social structure to one less communal and equal.

Aquaculture is a fairly young industry starting from the late 1940s in the Hula Valley. Production is very intensive at 8 tons per ha but the pond area has declined from 400 to 270 ha which is managed by around 20 employees. Pond size reportedly also has decreased rapidly in the last 10 years but yield has increased over the same time. Old ponds generally are converted to orchards or farm land and the total area of wetland still is falling.

Each fish farm is owned by a kibbutz. The NGAA The Northern Galilee Agriculture Association organizes the marketing by the fish farms as a collective but the income goes to each kibbutz. The local council levies taxes, organises the fish pond system and takes an overview on markets. They also regulate provide permissions regarding planning & water use, etc.

The major species produced are carp, Tilapia, mullet, rainbow trout, eel, sturgeon (for caviar export) and other species for local consumption. Ornamental fish species produced at localised small farms – no bird conflicts as these are well protected. Current challenges for owners include declining market prices and subsidies. The market for carp is reducing but still exists but the higher demands now are for sea fish and trout.

Tourism is an increasingly important part of the economic and social life of the area and there are 3,000 zimmer (similar to bed and breakfast accommodation) in the Upper Galilee and Golan Heights. Mt. Hermon has three lifts, two for skiers and current overnight stays are around 300 000, mainly on weekend-trips. The Nature Reserve attracts 18,000 visitors but plans are being made for an upsurge, with 100,000 expected next year as a result of a new sound and light show there according to one local guide. Tourism is organized through the Council of Upper Galilee and the Jewish National Fund who have a hotline for tourism information. Most visitors are nationals and recreational tourism includes bicycling, skiing, bird-watching, hiking, and some recreational fishing.

Great Cormorants first appeared in numbers in 1975 and increased quickly. Cormorant numbers increased in the late 1980s, with the biggest increase occurring following the 2nd Gulf War after which INPA data recorded much illegal shooting and many fishermen's complaints. The scale of the concerns was confirmed in 2000/01 when INPA allocated one person for coordination.

It is the Great Cormorant which is causing concern, rather than the Pygmy Cormorant, whose numbers are very low but increasing. The Pygmy cormorant was the major fish-eating species in conflict with fish farmers in Israel in the 1950's, which caused them to be driven extinct from Israel from 1960 to 1974. They began to reappear in small numbers through the 1970's and only began nesting in Israel again in the late 1980's. Today there is an active cooperative management plan for the Pygmy cormorant to prevent most conflicts with this species (Nemtsov *et al.*, 2000)³. But some people noted that for many people "...a cormorant is a cormorant" and that it would be important to improve education on which species is the 'main culprit.' Pygmy Cormorants eat smaller fish and roost away from Great Cormorants; but they are resident all year and specialise on eating fry during the stocking season so they may cause considerable financial damage. Some hold the view that the Pygmy Cormorant (a Red List species in Israel) must be preserved and allowed to come back to nature reserves while Great Cormorant numbers must be decreased. One INTERCAFE participant noted that there are about 4,500 pygmy cormorants in the whole world, with perhaps ca.1,000 in Israel.

Today there are eight kibbutz farms in the Hula Valley and each is permitted to kill up to a maximum of 6 Great Cormorants per day; no other waterfowl species may be harmed. In practice they shoot far fewer, partly because the cormorants learn to avoid sites where lethal control is used.

³ Nemtsov, S.C., Y. Sinai, D. Glasner, J. Morgan, K. Bojilov, R. Ben-Yosef, Y. Sharon, D. Kaplan, M. Har-Zion & M. Dolev. 2000. The pygmy cormorant (*Phalacrocorax pygmeus*) in the Bet She'an Valley: Challenges for conservation and management. Israel Journal of Zoology 46: 168-169 (abstract).

In fact there is a view among some that all birds should be removed. But interests in ecotourism also are gaining ground as evidence mounts for business successes as well as biodiversity and conservation gains. Previously low income from agriculture may improve through ecotourism with literally thousands of visitors coming to watch birds on sunny weekends especially in winter. In fact the valley is a large recreation area, well away from urban areas, with large flocks of cranes, pelicans and other birds and up to 380 species of birds in the migration season.

Also some fishermen are bird watchers and nature lovers and there are divided views within kibbutz between, for example, fish pond owners and ecotourism organisers. Some informants noted a lack of awareness of issues within kibbutz - perhaps also a lack of data - so that at the moment people can't say whether tourism has replaced fish ponds in terms of income.

Part of the idea for the cormorant conflict management campaign came from a Pelican project at Lake Agmon. Pelicans cross Israel in spring and autumn, feeding in fish ponds. Although they are passing through for only short periods (unlike wintering cormorants) – from four hours up to a couple of weeks - there can be severe local issues if many birds arrive at one site. By dropping surplus fish from fish breeding ponds into Agmon lake, the pelicans became more attracted to the area than to the fish ponds. As a result of cooperation between farmers, INPA and the LIFE project, the shooting of Pelicans has dramatically decreased in Hula valley fields since 2000.

Similar issues also have arisen with migrating Eurasian cranes which feed on peanuts and need to drink regularly. Some 20,000 cranes overwinter in the Hula Valley and cause damage to winter crops. By providing alternative feeding and drinking sites in the Hula Valley, concentrating cranes in a few fields, the conflict was reduced and ecotourism increased. The background information to the Hula Valley given in this section indicates the importance of 'reasonable solutions to the human:wildlife conflicts' in the area. The various stakeholders associated with cormorant-fishery conflicts in the Hula Valley are thus explored in the next section.

(2) Stakeholders and initial stakeholder analysis

Several presentations gave a list of main stakeholders from the presenters' point of view. An initial stakeholder analysis also was started in some of the eight small groups. It was not possible to complete and agree fully the stakeholder table below. However, it provides a rough picture of the range of stakeholders involved in fisheries-cormorant conflicts in the Hula Valley, and indeed beyond.

Stakeholders	Needs	Interests
Fishermen (as pond owners & individuals within the community)	Income from fishery <ul style="list-style-type: none"> – suitable markets & species – now and in the future Supply of water Up to now worried partly about the cormorants but far more concerned by	System of support – framework in which to operate Long-term perspective Limited political power now - interested in being more visible and influential In Lake Kinneret, fishermen are paid to remove fish as a way to improve the lake's

	competitive markets, cost of water use, imported fish and other restrictions.	water quality. In the Mediterranean, they are concerned by market competition from import of Egyptian fish
Kibbutz (community level)	Sufficient income to maintain organisation.	Looking after community Long-term perspective
Other local people		
Ecotourism businesses (including bird watchers)	Tourists Income	Maximising income from area Effective use of available resources – diversifying Maintaining wetlands Long-term perspective
Tourists		
Upper Galilee Farmers Association	Maximising agricultural efficiency (financial)	Maximising income – looking at alternative ways of using resources
Infrastructure providers (local economy) – hotels, shops, gas stations, etc.	Visitors Income – sufficient to cover investment costs	Maximising income Framework for local development Effective use of resources Long-term perspective
Suppliers to aquaculture businesses		
SPNI – Society for Protection of Nature in Israel (pro-wildlife NGO)	Meet objectives, Public support, Sustainable ecosystems	Preserve ecosystems – wetlands, etc Managing resources effectively Balancing interests Raising awareness of issues
Ornithologists (species hunters/ amateur)		
Educators – schools, universities	Sustainable ecosystems	Training people Raising awareness of issues Long-term perspective
Academia – scientific research e.g. Inst. For Lake Research, Haifa Uni., Technion, ...)	Income Knowledge	Understanding issue – the facts Communicating findings – at appropriate level Advising policy makers Scientific reputation
Local council	Income – taxes Meet requirements of local community (legal responsibilities) Balance income & delivery	Achieving balance Sustainability Long-term perspective
Upper Galilee Council (local government)		
INPA (Israel Nature	Meet objectives, Govt	Resolving conflicts –

and Parks Authority) – government wildlife protection agency, affiliated with Ministry of Environment	directives & international obligations Sustainable ecosystems	managing problems Preserve ecosystems – wetlands, etc Managing resources effectively Supporting research
Ministry of Agriculture (Department of Fisheries is part of this Ministry)	Effective delivery of Govt policy	Sustainable use of resources Viable farming and fish producing/catching industries Effective Regulation Meeting national & international targets & obligations World & local markets Long-term perspective
Ministry of Environment	Effective delivery of Govt policy	Sustainable use of resources – environment, biodiversity Effective use of water Meeting national & international targets & obligations Long-term perspective
Ministry of Tourism		
Ammunition/fireworks trade		
Hula Valley Nature Reserve (run by the INPA)	Effective delivery of Govt. policy	Maintain Hula ecosystem, education of visitors
Jewish National Fund – quasi government development fund	Effective land management	Resolution of conflict, Assure income to stakeholders
General public	Basic requirements for livelihood – food, housing, infrastructure, education	Community – local & national Environment & biodiversity Long-term perspective
Media	Stories Conflicts! Income	Issues of interests to readers/listeners/viewers
Fishermen on Lake Kinneret		
Tour operators and boat owners on Lake Kinneret		
Other Lake Kinneret Stakeholders		
NGAA The Northern Galilee Agriculture Association		
Air force	Need safe take-off and landing in this area. A major problem is large	They might be interested in solving this problem by removing the cormorant

	flocks of migrating birds near flight paths. They work very hard to protect the airfield.	roosting site (the threat) if no alternative is found. They will not risk human lives and cost of planes.
Israel Electric Company	A powerful stakeholder but government owned so can't be seen to be profiting. Near the Hadera-power station- cormorants have a major roost site. Fish ponds, historical sites, and power station within a few hundred metres. Monopoly control of electricity high salary, high service, high prices.	have to deal with cormorants as they are inviting public to see the site as a bird colony (public not attracted by fish ponds but are attracted by birds/cormorants). Like to be popular with the public. Producing with fossil fuels- would like a greener image.
Ministry of Health/Veterinary Science		
The Water Commission		
Agamon Project		
Exporters (fish quality, reliability)		
Ukrainian stakeholders ?		

Many areas of common ground in terms of stakeholders' needs, both through the above (very preliminary) analysis and through discussions at a more informal level with many of the stakeholders mentioned above. For example;

- having a strong local economy
- valuing nature and biodiversity
- having safe, healthy and sustainable food production
- recognising that needs differ with different stakeholders
- providing stability for the area and for the next generation
- funds in order to continue and improve conflict management efforts

A number of exchanges between stakeholders were possible during the workshop. Sometimes it was possible to be even more specific about areas for agreement. One example was between a fisherman's representative and a representative of the Israeli Nature Protection Agency.

INPA REPRESENTATIVE AND FISHERMAN'S REPRESENTATIVE	
<i>AREAS OF AGREEMENT</i>	<i>AREAS OF DISAGREEMENT</i>
<ul style="list-style-type: none"> • No. of cormorants should fit the natural carrying capacity • Today the number of cormorants in Israel is higher because of fish ponds • The problem requires management • Scaring, stress, limited hunting and reciprocal management in breeding areas • Cormorants should be allowed to feed in Lake Kinneret and the Mediterranean Sea • Great cormorant is not endangered 	<ul style="list-style-type: none"> - Who is responsible for the damage the birds do - Chasing from natural reserves – INPA “no” fishermen “yes” - Ammunition – INPA “no lead, other non toxic methods, fireworks” Fishermen “lead or anything else – shoot them (but fireworks are of course OK – if it works)

A second example would be the exchange of views between a worker with the conflict resolution group for the Upper Galilee Farmers Association (UGFA), an INPA ranger and a kibbutz aquaculturalist (KA).

Upper Galilee Farmers' Association (UGFA)

In living memory cormorant numbers declined then, eight years ago, rose again, causing problems in fish ponds. Before action began, there were about 5,000 cormorants roosting overnight in trees outside the Hula Valley nature reserve.

Guards were placed on each fish farm & scared the birds with fireworks at night (various noises & colours), detonated by remote control – much cheaper than bullets or cracker shells. After just one month, all the birds were roosting inside the nature reserve.

By the year 2000, 9,000 cormorants were roosting in this way, with about 5,000 visiting the fish ponds. So further scaring was undertaken, backed by some shooting to kill. By 2005 (4th year of action) 1,500 cormorants were roosting in the nature reserve at night, of which 200 tried to feed at the fish ponds each day; the remainder flying each day to feed at Lake Galilee, 50km away. The ‘missing’ birds now both feed and roost at Lake Galilee.

\$100k was used to fund the anti-cormorant campaign, contributed by fish farmers. By 2005, the sum had shrunk to \$8-10k, a consequence of the success of the campaign. The fact that fish can be grown again during the winter is also a success

The main needs now are help and money! However, cormorants are no longer the main problem as fish production is in decline due to diseases, low water temperatures, and market reasons.

Israel Nature Parks Authority (INPA)

There are two main nature conservation organisations in Israel, both of which act to protect nature. The INPA, which is a government agency, and the SPNI (Society for

Protection of Nature in Israel), which is a pro-wildlife NGO. In recent years there has been a large agricultural crisis– some farmers are now involved with tourism (ecotourism, fishing tourism) & the main conflict is between tourists and farmers. Kibbutz used to grow their own food, but now farmers are involved with agriculture and tourism.

Because nature conservationists and farmers reached a solution regarding cranes, this helped negotiations be productive between fish farmers and nature conservationists. Academics came in and collected data, so the facts are no longer in dispute. Therefore, action was possible.

The situation is different elsewhere. In the Bet She'an Valley a variety of methods were tried to control cormorants, including farm-by-farm, co-ordinated scaring. This worked well, aided by local co-operation, but was hugely expensive. (Note: there used to be 1,500 cormorants in the area, roosting in Jordan, nearby; now there are 1,000 birds, despite spending a million shekels/year, some of it by the Israeli government).

A Kibbutz Aquaculturist

The problems in the Hula Valley are minute in comparison to other areas, and the solutions are only really relevant to this area. All aquaculture has suffered constraints, especially over the cost of water (which used to be free but has to now be bought). There is concern over the pollution of Lake Galilee, which is largely derived from nitrates from the now-dry area in Hula Valley, and the need to protect the lake from predators e.g. channel catfish, which orthodox Jews will not eat as it bears no scales.

It should be remembered that Lake Galilee is first and foremost an extremely important source of potable water, and the water quality is monitored by the Israeli government (must be no increase in nitrates & phosphates). However, it is also used as a commercial fishery, largely by poor people, whose livelihoods had been cut by 50%.

Most solutions to cormorant conflicts are local ones, even if they are replicated elsewhere. What works best is scaring to deter cormorant feeding by co-ordinated action. However, given that scaring merely moves the problem elsewhere, we really need action at a pan-European level. (Two INTERCAFE participants explained why this was difficult).

What should not be done includes:

1. Do nothing!
2. Expand the use of overhead nets over fishponds. There have been problems over the entanglement of birds.

INTERCAFE's role should not be to look at lots more case studies but needs to write statements or recommendations to inform policymakers

In discussion it was agreed that the local situation does not always - or even often - apply elsewhere. However, the 'bottom line' was that there is no common strategy or concept for the management of cormorant conflict.

After this initial exploration of stakeholders and an initial stakeholder analysis, Case Study participants attempted to draw things together into a synthesis of emerging issues, including discussions of what has worked well in the Hula valley, what has worked less well, and barriers and opportunities for disseminating information about the Hula Valley ‘success’ elsewhere. These discussions are reported in the following section (3), which then leads on to some final conclusions and implications (section 4).

(3) Issues emerging

In this section we present something of the wide range of issues that was discussed, looking at (a) what worked well and might be worth considering elsewhere, (b) what did not work so well, (c) what the barriers might be for disseminating success in the Hula Valley to other places. And (d) additional general points that were of interest.

Several key points have emerged from this case study that have relevance for policy and strategy. These are summarised in the final section of this report. Meanwhile, because the meaning of ‘success’ so often depends on your point of view, some of the points below clearly increase the chances of success (such as building trust and maintaining good communications) while others appear under both “successful” and “less successful” sections depending for example on scale, ecology or migration patterns (e.g. fish restaurants, local scaring)

There is a relationship between scale and the goals of the project when considering ‘success.’ Perhaps the clearest example of this came up when comparing Hula Valley with Beit She’an Valley to the south.

Most delegates felt that the Hula Valley has been successful on several levels at the local level. The first success was actually achieving successful co-operation between fish farmers and scientists. Some fishermen have accepted the plan because they have been involved in developing the plan. Also, getting agreement on the same agenda within INPA (from ecologists to rangers) with INPA then cooperating with fish farms can be considered a success. But perhaps there have been problems transferring knowledge beyond the valley because stakeholders from Beit She’an were not involved in the same way. This seems to have created an obstacle to acceptance of the management plan and implementation of it.

Having said that, it is impossible to see how a few leaders, especially from the scientific community, could have stretched their resources even further to lead and manage stakeholder engagement across such a broad area beyond the Hula Valley. Indeed, it is important to discuss success and lessons learned in the context of this report in a spirit of collegial support, recognising that many people have demonstrated great commitment and skill locally and perhaps shown some of the way forward for scaling up.

Perhaps it is best, then, to see things as work in progress with an eye more on “Let’s take the things that worked well and see how we can scale this up” rather than “Let’s look at what hasn’t worked well and blame people for not succeeding in everything on their first attempt.”

What has worked well?

1. *Establishing and building trust, and agreeing common goals.* The Hula Valley case is solution oriented, stakeholder friendly and demonstrates a considerable amount of mutual trust. A lot of information was exchanged prior to the Case Study meeting
2. *Building and maintaining effective communications, information exchange, coordination, monitoring and organisation among stakeholders.* Co-ordinated efforts have been key to success. The project has been flexible, growing out of the local context where people were allowed to express their opinions openly, and participants have had a standing in local communities. Its management depends on local agreements which naturally vary from area to area even if they share common elements. The project was able to build on successes in the area. For example, collaboration on cranes helped to establish trust between nature authorities, scientists and fish farmers. This in turn helped to enable conflicts to be dealt with internally. Today the Agamon Project continues to support the ongoing cormorant project.
3. *Experience with scaring strategies.* The cost of the scaring effort has reduced progressively as people have been getting better every year on doing the job of scaring (timing, location, etc). Intensive scaring with good coordination between intensity (especially of fireworks), timing and location has worked well at reducing numbers in the Hula Valley. So properly managed scaring proved a success at local scale as measured by pond owners as practical option for managing conflict.

It is now generally recognised that use of lead is a bad thing. Hundreds of kilos of lead reportedly remain in water at Hula Valley from cormorant management and lead has also been linked to water quality in Lake Kinneret. One participant noted that in Poland lead remains a contamination problem that is dangerous for wildlife after 50 years of hunting. Other perceptions also have changed – many fishermen now accept ‘reasonable numbers’ of birds.

4. *“Fish restaurants”* – The use of trash fish appears to have been a great success for management of pelicans. But trash fish are not available all year (e.g. not growing in winter and using trash fish does not come for free - Someone has to pay for collecting and moving them. At present the Ministry of Agriculture pay for movement (not the collection). The media were used to communicate this story which generated much public interest but embarrassed fishermen.

What has worked less well?

1. *Scaling up.* It is not easy in the Hula Valley, as with so many other areas of cormorant-fisheries conflict, to generate lessons and learning that can actually be applied at different scales. Some think that while the project may have solved the local problem and conflict has reduced in the Hula Valley, the problem may have shifted elsewhere, for example to the Sea of Galilee and that the Hula Valley model therefore is not a solution. Local collaboration has

proved broadly successful, regional collaboration is developing and overall, and an international dimension is required.

2. “*Fish restaurants*” - Cormorants are present all winter so feeding trash fish is no solution in the case of cormorants for some participants who argued that this could actually encourage birds to stay in the area and therefore keep pressure up on valued fish species.
3. *Adverse publicity* – one example is given above about fishermen being embarrassed by an article on trash fish use with pelicans. Another example concerns a newspaper article that reported parasite transmission by birds. This had a very bad outcome because the market was severely impaired and the report caused bad relationships among some stakeholders.

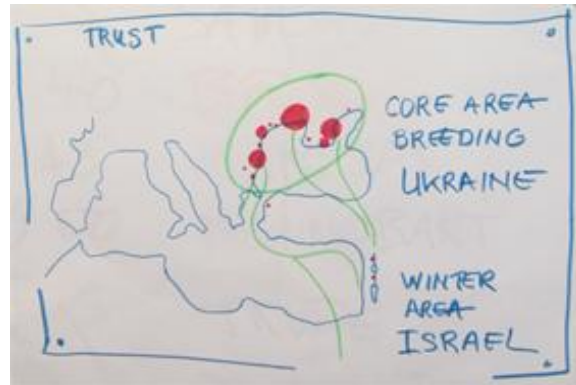
Barriers and opportunities for disseminating Hula Valley success elsewhere

1. Scaling up to a larger area with diverse fishery and habitat types will not be easy given the need for effective communication and coordination of deterrents as used in the Hula Valley.
2. Unless the policy is to kill birds, they have to feed somewhere and cannot be endlessly relocated. The effectiveness of any program will depend on geographic location, e.g. on alternative foraging being available. The Hula Valley (and another pond farming area, Beit Shean) have the Mediterranean Sea & Lake Kinneret. But these may not be options for all fish-growing sites.
3. Trying to regulate a migrating population is very tough. Reducing the size of the population that reaches Israel in winter would require outside involvement. In the case of the Hula valley, this means Ukraine. Great cormorants winter in the Hula Valley for about 100 days, with the pygmy cormorant also breeding in very small numbers. Some people are worried that Great Cormorants will become established to breed in the valley from October to March.
4. Water policies and water availability are fundamental issues underpinning decisions on agriculture, fisheries, etc. The national water policy, as it is expressed regionally, can have diverse effects on fisheries management in the various fish-growing regions of the area.

Options

- a) Control population in Ukraine, increase effort in Israel, pact between the two countries. (high costs, difficult negotiations, 75% reduction ~ 150,000 birds)
- b) Give up fisheries in Hula and concentrate on other ways of earning income: agriculture, horticulture (loss of wetland habitat, effect on other species)

- c) Cormorant-oriented management at the spot of interference, taking crane and pelican examples further. Optimise habitat and species management [cormorant, water quality, fish]. (Extended wetland development, increasing carrying capacity for fish and fish eating birds)



Cormorants' core breeding area in the Ukraine, wintering area Israel
(from participants' small-group map in workshop)

General Points

1. Lake Kinneret

- Lake Kinneret is the single most important national water resource. This is its most important function.
- Lake Kinneret has commercial and non-commercial species + one endemic fish species (the Kinneret Bleak *Acanthobrama terraesanctae* or Lavnun Ha'Kinneret, see page 20).
- There are no predatory fishes in the Lake.
- Lack of data on Kinneret conflicts or what has happened in Lake Kinneret before and after stocks of cormorants were dislocated there. Lack of knowledge-what are the cormorants eating in Lake Kinneret?
- The government uses Lake Kinneret as an experimental lake (introduce different fish species, have the fishermen remove sardines - 'Kinneret bleak'- in order to improve water quality/transparency). Is this monitored?
- 191 scientific journal publications found on "Lake Kinneret" as the search word (only 5 on fish, 0 on birds)

Possible future problems:

- Lake Kinneret fishermen (decrease in annual catch from 2,200 to 1,100 tons from 1990 to 2004) NB. Although this decline was probably not related to cormorants (occurring whilst the market for 'sardines' collapsed and decreases in water levels affected reproduction of sardines and Tilapia), fishermen are clearly worried that increased cormorant numbers will exacerbate the situation.
- Water supply from the Lake Kinneret
- The ecological status of the Lake Kinneret (environmental/conservation interests)
- Is the increase of cormorant numbers on Lake Kinneret the reason for lower fish numbers.

- If it can be proven that cormorants can be blamed for water quality on Lake Kinneret, we would get a powerful stakeholder involved - Water Commission, Ministry of Infrastructure. However, they are reasonable.
- They are monitoring water quality and whilst it remains under acceptable limits, they are not involved.
- New tourism development activity- a success- sailing on Lake Kinneret to see birds.

(4) Conclusions and implications

Policy development - what contribution could the Hula Valley Story make?

INTERCAFE does not have a mandate to suggest or recommend particular policies. However, INTERCAFE is working in a specific area of natural resources conflicts and the Hula Valley case study, together with previous INTERCAFE work, suggests three aspects of policy development to which INTERCAFE could contribute.

1. The policy making process itself - how policy might be drafted, amended, implemented and evaluated.
2. The interpretation, use and ultimately the value of different types of knowledge as seen by policy makers
3. Policy implications of the range of spatial scales and jurisdictions that exist for cormorant-fish species interactions across the INTERCAFE area.

In this report we will present some of the issues emerging, noting that specific policy-relevant outputs from INTERCAFE are being planned for 2007.

The policy making process

Tyler (1999) discusses elements of a policy framework for managing natural resource conflicts, including stakeholder analysis, developing processes for interaction, information-sharing and communications among stakeholders, and developing effective roles for intermediaries. He notes the importance of relevant, accessible information as a prerequisite to consensus-based planning, pointing out that participatory research processes give control and initiative to those involved.

An inclusive, negotiated approach to policy making also is advocated by the European Commission which refers, for example, to approaches such as “cross-sector consensus on key challenges” and “clear road maps” for EU actors to “pull together” (e.g. European Commission, 2005).

So if consensus building and agreeing roles are among the means for developing a policy framework or road map, what might be the range of stakeholders that need to be involved?

In Israel the major actors involved include:

- local peoples and communities
- local and international NGOs
- fisheries and wildlife groups
- various provincial and national government departments and authorities

- faith-based organisations
- local and international agribusiness, tourism and other companies
- a range of external actors whose opinions and influence are important.

Each of these groups, and the sub-groups within them, bring particular views, needs and expertise.

In the Hula Valley flexible methods of working, with iterative processes of negotiation, action and reflection proved very effective in developing ways forward for a range of stakeholders, some of whom initially were in conflict.

In effect, for the small scale at which people were working, this approach became the policy-making environment. The policy was to have an enabling process so that solutions could be developed from within rather than imposed from outside the area.

This policy was effectively translated into strategies and actions by the facilitation team and other stakeholders. Their approach enabled people to work together in ways that enabled feedback and reflection from negotiations to be the foundations for creative suggestions. These suggestions informed actions to address the conflicts that were either accepted or rejected as evidence accumulated.

Deciding the policy of “what to do with cormorants or fisheries” was not the issue. Agreeing the process was. Those agreements and processes were possible because of the policy approach of those involved. Solutions emerged and were agreed as ‘policy’ for the local level, having been developed in a participatory and largely inclusive way.

The two key policy-making principles that probably hold for broader scales are:

- 1) Provide support for a policy-making process that is inclusive, clear, and based on sound stakeholder analysis that enables people to be clear about their roles.
- 2) Provide support for cycles of action and reflection where policy is developed iteratively based on evidence from the impacts (outcomes). This requires policy to be practical and fairly quickly responsive to experimental or action-based strategies and activities. It also requires that lessons from strategies/actions are sufficiently well monitored, recorded and communicated that they can pass policy-relevant information forward to policy makers.

Different types of knowledge

The policies that were developed in the Hula Valley relied heavily on different types of knowledge. In other conflict situations also, it is important to provide mechanisms for different voices to be present at the policy making table.

Local knowledge sometimes is seen as ‘inferior’ to scientific knowledge. However, local knowledge is often a key component of the “... relevant, accessible information” that Filer (1999) notes is important for consensus building in the policy making process. Local people know their area better than outsiders and have generations of accumulated understanding about the fish and birds that live or visit there.

Of course, local knowledge also is subject to interpretation and a range of views may exist. Also, perceptions that may have no basis in scientific fact may be the reasons

why people behave as they do. Simply stating that something is a scientific fact may be insufficient to bring about a behaviour change. However, this richness of understanding needs to be acknowledged, respected and incorporated into the body of knowledge and experience that informs policy, as it was in the Hula valley case study.

To be effective, then, policy needs to draw on and be responsive to both local and scientific knowledge. At the scale of the Hula valley, this proved possible because the policies, and the strategies that developed from them, were confined to the local area. However, we learned that things proved a little more challenging when looking to scale up learning and policy development across a broader area.

Policy making across multiple scales and jurisdictions

We had the good fortune to meet with commercial fisherman from further south in Israel and to visit other areas where different perceptions of the conflicts between fisheries and cormorants existed. It soon became clear that responses in one area (Hula) were not seen as relevant further south. There were several reasons, including the differences in population sizes, fish stocking densities and the fact that cormorants flew in and out from Jordan, just across the river from one large commercial fishery.

A useful policy question, though, is not whether one approach is right or wrong, or whether Hula “solutions” could be scaled up across Israel, but whether the process used in the Hula valley might have value elsewhere.

Most people felt that the best approach would be to provide policy support for bringing stakeholders together to look at scale-dependent solutions (including the principles (1) and (2) mentioned above). However, there were two other major views that have also come up elsewhere in INTERCAFE’s work;

- It doesn’t matter what you do over a large geographic area or miles away from us – the birds need shooting in our area– there are too many of them and they need to be kept off our fish.
- It doesn’t matter what you do in a small geographic area or within one jurisdiction, the solutions rest in trans-national agreements that are for several reasons (mainly political) unlikely to be possible in the short term.

The first view was held by commercial fishers with large numbers of fish in ponds. The second view was held by managers and ecologists who noted that birds breeding in Ukraine provided most of the cormorants coming to Israel during migration. Therefore, a ‘total numbers’ based solution would necessitate policy agreements between Israel and Ukraine.

What seemed to be emerging from the Israel case study was a series of questions about (a) the nature of the policy support that might best assist the search for solutions across different jurisdictions and scales, and (b) how to support effective dialogue between local areas where one group feels they have a ‘solution’ and another group feels that this solution has come at the expense of moving the cormorants to other people’s areas.

In conclusion, there does seem to be a need for policy support for building and maintaining effective communications across areas within Israel. This support might help people to agree key stakeholder groups and target processes that focus on building social capital, particularly trust and confidence among stakeholders facing cormorant-fisheries conflicts at various scales (Jones, 2005:236).

Issues of scale and multiple jurisdictions vis-à-vis cormorant-fisheries conflicts will be the subject of a small-scale scientific mission in early 2007.

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Part (5) Question and Answer session with local experts

Additional local stakeholders included: Nevo Herman, Aviad Adam, Simon Tubul and Meir Shmil

In the evening of Day Two, INTERCAFE participants met a number of local experts for dinner. After the meal there was a general, informal question and answer session the transcript of which is provided below:

Q: We've heard quite a few people talking about "success" at this meeting in relation to cormorant-fisheries management in the Hula Valley. When is it a success? And for whom is it a success?

A: *Yes, things have been a success. This is the first winter we have been able to grow fish in the big reservoir. It's the first winter we feel able to grow fish.*

Q: Why?

A: *The cormorant numbers are going down.*

Q: What techniques have you used? If you had to make a list, what order would you put the measures?

A: *The big reservoir is near the nature reserve – the place where cormorants roost. We thought it was maybe too close to be effective in preventing damage. But because of the co-operative project [between fishery managers] they have reduced the number of cormorants roosting in the nature reserve from 9,000 to no more than 1,000 today. So this is the first time we will be growing fish fry in the winter. There would be a tremendous economic advantage if we can pull it off. We usually put out small fish in March, now we can put the fingerlings in the reservoir in winter for them to grow there over the winter. The success is that we can market fish in June/July instead of September/October.*

Q: So you can now get another growing cycle in?

A: *Not necessarily. But the prices for our fish are higher early in the season. We can't get more water [for the fishery] once we have drained the ponds at fish-harvest time, so we can never get two fish-growing cycles a year.*

Q: Which mitigation measures have you used?

A: *Information, organisation, and timing! When the first cormorant comes to Israel, we know. When we started each of the farms fought between themselves. But we decided to work together, to pass information on-line – "I'm scaring birds – so be ready". We got it to work across the whole valley, we use walkie-talkies and things to keep in touch.*

We scare birds all day long, until the birds move to the sea of Galilee. Economic success would be to grow fish in the wintertime. Every year my goal is to decrease the management involved in the mitigation techniques. This cost us 300-400,000 NIS (about 50,000 euro) at the start. Last year it cost about 80,000 NIS (12,000 euro). That figure is probably about stable now. But, of course, our income should increase because of the economic benefits of being able to overwinter the fish.

We deal with pelicans too – as well as the cormorants. The money [spent on mitigation techniques] is split 50:50 between cormorants and pelicans.

A guy comes in to the farm in the morning, he does a patrol around the reservoir, he scares the birds and then starts working. If the birds appear, we put more pressure on them – for 1 or 2 days – until they go. So, we don't need full-time 'guards', but it was almost a full-time job when we started!

Local researcher - statement: There is something very important for me that has not been mentioned. When the Hula Valley project started, anyone who went to the ponds used to see many dead birds lying around. Nowadays there is still some shooting, however the numbers of dead cormorants is much, much lower than before. One of the keys to success (from my perspective) was the shift from killing to scaring.

Q: But that doesn't affect cormorant numbers does it?

A/general conclusion: *Dead cormorants can't teach any others – but living ones do! Killing cormorants is not good.*

Q/statement: Working for the fishing industry in Denmark, I see here to some extent a sense of “going together”. This is not the case in Denmark. We have escalated conflicts when the authorities do not recognise that there is a problem.

Q: Do the birds have an information exchange system?

Researcher A: Don't know. What do the fishermen think?

A: *I am a hunter, it is a hobby. I can kill birds – I do not have a problem with it. But I don't actually want to do it because they may learn from one another.*

In the 1950s/60s there were lots of [pygmy] cormorants and we could not grow fish. So, we decided on a massive killing – a cartridge bounty scheme. From the 1960s to the mid-70s there were almost no cormorants [of either species] in the valley at all. [then numbers started to increase - maybe 40 in the valley in 1974?] I don't agree with the 'teaching' idea – a dead cormorant does not return. A dead one also passes a message on to the others.

A: *But we are not in the 1950s. Bad publicity can affect the whole industry and the way it works. It is better to have a pond clear of cormorants – dead ones do attract others (and so do live ones) – it is best to scare them all.*

Fisherman statement: There is a question – the relation between success and the fact that you are shifting cormorants to another region. It is not a success for those [farms/farmers] in other regions. You need to solve the problem at the pan-European level. Otherwise, these are merely local successes.

Q: If you were advising fishermen on Lake Galilee, what would you advise them to do?

A: *Cover the lake with a net [everyone laughs!]. For twenty years in Lebanon they have shot all the birds – and all the butterflies! [everyone laughs]. [implication is that one solution would be to return to a “massive killing”].*

(Ofar Sivan): I have two comments. In Upper Galilee there has been a decline in fish culture. There are fewer farms active. In ten years time there will be no ponds in this area. We are going to face a different ecological problem by shifting/moving things

about with very unpredictable results. The second comment is that there is no scientific evidence that supports or refutes this or other theories. The cormorants are there and they are eating fish - most of the fish from Lower Galilee and the Hula Valley. If this trend continues, a few years from now a second problem will have been created by these scaring activities.

A: *A few kilometres to the south at Bet Shean, they keep cormorants out of their ponds there too – so [implication - if this becomes the only place where birds are not scared/killed] there may be a problem in the Lake of Galilee and thus for the main water source for Israel [perception is that cormorants would reduce water quality there].*

Q: The pygmy cormorant – what methods would you advice would you give for them given the success of this programme.

A: *Even in Hebrew, there is not a good answer [much laughter!]. We don't have the information.*

A: *There are pygmy cormorants in the breeding season [so they are feeding young etc] – it's a real problem.*

Q: A response to [the fisherman's statement]. Why blame the cormorants? Aren't there many other risks, for example your customers not eating enough fish.

A: *We could discuss the first question forever. The farms are there. Some cormorants are scared away from some places and the numbers there are smaller. But its an invasion, its something new. There are farms that are mismanaged but that's nothing to do with cormorants. We are talking about enormous figures at the national level. So it is a conflict of interest – one that must be solved in this broad context. Not just in Israel, it needs to be broader.*

Q: Do you see differences between the Hula Valley and Lake Galilee in their communities of fish? For example, 'wild' versus 'harvestable'?

A: *You cannot steal the livelihood of a fisherman because you love birds.*

Q: But the fish in Galilee are not private, its public.

A: *Farmers here [Galilee] are obliged not to break the law and are restricted in their actions. Lower Galilee people are entitled to protection or compensation too. The main issue in Galilee is water quality, not cormorants and not fish. If the water quality is endangered there will be drastic steps [taken by the authorities].*

Researcher - statement: We are talking about hypothetical things. People use the word 'damage' freely without backing it up. There is a lot of ignorance and assumptions.

Fisherman: Only [the fisherman who made the statement above] remembers why we are here – its because of the overpopulation of cormorants at the pan-European scale. That's why we need a pan-European solution.

TK: It is a very unique situation here – mostly aquaculture, fishermen and agricultural authorities. In the next 5-10 years, a pan-European solution may not happen – so what should happen in the next 10 years?

Ofer A: *Success for one farm is catastrophe for another. Or it causes real problems in other species or other places.*

The basic need is that we do not have scientific data. There are many ideas etc etc. We must work together to collect the evidence and combine with information from Europe.

We should go to Lower Galilee and see the birds. Learn their habits and think about what will happen. Decisions are not being made on evidence but by gut feelings.

Fisherman 1: *I am concerned about tomorrow not about 10 years time. The main problem for the fishery is not the cormorants.*

Fisherman 2: *Its fish OR cormorants – no co-existence is possible. The future will be neither. When all the fish are gone, there will be no cormorants either.*

Q: *Do you talk to fishermen from other areas? Can you share ideas?*

A: *Not really on a day-to-day basis. The regional concept has been learnt from the Bet Shean valley.*

We have learnt from Bet Shean the concept of the importance of regional cooperation. But the methods used here in the Hula Valley are based on scientific data on dietary analysis, behaviour etc [implies that this is not the case in the Bet Shean valley].

The methods [to raise fish and to deal with cormorant and pelican predation] used in the Hula Valley are TOTALLY different to those in Bet Shean. The Hula Valley philosophy is to teach cormorants that it is not in their best interests to be here. There is a contention discussed in the Hula Valley that cormorant numbers have declined here because fish numbers have fallen. This is not true. The declines did not coincide. Cormorant numbers declined even when fish numbers were high.

Ofer: *Part of it is the fact that marginal profits were very low. 10-15 years ago [we/they?] spent much effort and more money – 40,000 NIS doesn't make sense, its too cheap. People in Upper Galilee have a right to make a living from anything, We need to try to find a reasonable way. Our books are open, the numbers are there. They know what they did.*

Part (6) Group work summaries

Working sessions with eight small (n = 7-9 people) groups made up of both INTERCAFE participants and local stakeholders were held. These work groups met on all three days of the Workshop and their general Terms of Reference throughout were to discuss and explore:

(A) Stakeholder analysis and conflict management process

- (a) The stakeholder community, and their needs and interests.
- (b) The outcomes of the Hula Valley management programme and the processes leading to it, specifically (i) what worked well and could be recommended to others and (ii) what should others be recommended *not* to do?

(B) ‘Technology transfer’ within Israel and internationally

- (b) The barriers and opportunities for ‘exporting the Hula Valley “success” elsewhere in Israel.
- (c) What contribution can the Hula Valley experience make to policy development outside Israel at the international level?

Group 1

INTERCAFE: Erik Petersson, Ivailo Nikolov, Faustas Stepukonis, Szymon Bzoma

Local stakeholders: Ohad Hazofe and Ofer Sachs

This group discussed the national perspective

Stakeholders	
1. Public	
2. Fish farmers	
3. Fishermen	
4. Nature conserve/ fish species	
5. Nature conserve/ other taxa	
6. Ministry of Agriculture	
7. NGOs	Ornithologists (species hunters/ amateur)
8. Ministry of Environment	
9. Universities	
10. Air force	
11. Israel Electric Company	
12. Ministry of Health/Veterinary Science	

1. Airforce - they need safe take-off and landing in this area. The problem is that there is a National Park nearby to bird flight paths. They work very hard to protect the airfield. They might be interested in solving this problem by removing the roosting

site (the threat) if no alternative is found. They will not risk human lives and the cost of planes.

2. Israel Electric Co. – a monopoly company that control all electricity in Israel – they give high salary to their employees, high service to the customers, but many also say that they have unnecessary high prices. The company are to a large extent producing energy with fossil fuels and clearly they would like to have a greener image. In Hadella there are fish ponds, historical sites, and power station - all within a few hundred metres, and the cormorant have a roost site near the power station. The company do not like to deal with cormorants as they are inviting the public to see the site as a bird colony (the public are not attracted by fish ponds but are attracted by birds/cormorants). The company would like to be popular with the public. A powerful stakeholder but government owned so can't be seen to be profiting.

3. Fishermen. Limited political power. They want a livelihood that can provide them with an income. Up to now they are not so worried about the cormorants but more concerned by competitive markets, imported fish and other restrictions. In Lake Kinneret, fishermen are concerned about water quality. In the Mediterranean, they are concerned by imports of Egyptian fish. Stakeholders are more concerned about other issues than cormorants.

There have also been some economic changes in some cooperative owned fish farms. The younger people do not prefer to invest money in fish farming any longer, rather they prefer to invest in other businesses, that they think will give better profit in the future.

Knowledge and processes of knowledge transfer

One problem is the lack of knowledge concerning the cormorants in Lake Kinneret. As an example there are few good investigations showing what the birds are eating. What needs to be done is to collect and process data. Another issue is whether the increase in cormorants at Lake Kinneret is the reason for lower fish numbers there?

There are both practical and “relational” problems in transferring knowledge. From the beginning, the governmental institutions have failed to involve the stakeholders from Beit She'an in the process, and as much they would have liked, and this has become an obstacle to the acceptance of the management plan and to its implementation. On the other hand, some fishermen have accepted the plan because they have been involved in developing it. It was stated that it is very important to really make huge efforts to get all people (stakeholders) involved in the conflict resolution process. People (representatives from different stakeholder groups) must work together. This is not only restricted to non-governmental stakeholders. From the beginning different governmental institutions had opposing views that were not “regulated” before the meetings with the stakeholder started.

Success - there are different levels and different stages of success. The first success was to get fish farms to cooperate (co-operation is a success) with scientists. Even getting agreement (from ecologists to rangers) within INPA can be considered a success. All agreed on the same agenda, which was also a success. Thereafter INPA cooperated with people from the fish farms. People value success in different ways - it

is necessary to allow people their opinions. Another success was when fishermen were convinced to try another method rather than shooting in the Hula Valley. It was also a success when fewer animals were killed (this is also linked to water quality in Lake Kinneret. As less shooting results in less lead in the water - hundreds of kg of lead in water at the Hula Valley originate from cormorant management). Lead in water is not a small issue, for example in Poland some areas have problems of contamination after 50 years of hunting. This is dangerous for wildlife, and perhaps in the long run even for humans. So, from this point of view, management without shooting is a success.

However, such management might appear as a limited successful for the fish farmers. What they would consider a success is that there are limited numbers of cormorants (fewer cormorants) and they can stock earlier in the ponds. This will make it possible to grow fish to a marketable size earlier than is currently possible. Today, a new tourism activity has developed: sailing on Lake Kinneret to see birds. This might also been seen as a success for some stakeholder. Thus, success depends on who you ask and how the stakeholders are affected by the birds.

It was stressed that it is very important that all stakeholder try to use the same language (agree upon what different words/terms means). At least the governmental institutes/departments have to speak with the same voice. A common policy is necessary within INPA. But to get there takes time and it is difficult. Issues that need to get some kind of agreement on is (for example): How many cormorants? Should they be controlled? And if the should be controlled – how?

If it can be proven that cormorants can be blamed for lower water quality on Lake Kinneret, we would get a powerful stakeholder involved - Water Commission, Ministry of Infrastructure. However, they are reasonable. They are monitoring water quality and whilst it remains under acceptable limits, they are not involved.

Group 2

INTERCAFE: Sandra Bell, Stefano Volponi, Nikolay Kissiov, Susana Franca

Local Stakeholders: Simon Nemptzov plus one

Reflections on background and process

This group's discussions were sometimes difficult. For instance, an 'authorities' representative and a fish farmer were doing a lot of the talking and arguing. However, I noticed that some of the things they were saying were not actually that contradictory and that their interests overlapped to a large extent. Discussions were getting more heated and argumentative and so I said "let's get radical. From where I am standing you seem to agree on a lot things. Let us do a 'thought experiment' and identify for the other group members (who are not local and do not know all about this conflict) the things that you do agree on".

As for justification of this exercise - as all the books on collaboration state - it is always best to flag up, at least initially, what you can agree on rather than keep the focus all the time on what you do not agree on. The books call it identifying common ground - then of course you have somewhere to stand together, rather than being in different places, which only confirms a sense of opposition (entrenchment). Having these third party 'outsiders' asking to be enlightened about the conflict was, I think, a big factor as it the local experts a joint responsibility to the rest of us. We all asked a lot of questions.

One important revelation was the fact the fish farmer used his own resources and drove up to the Ukraine to assess the situation there and find out for himself that the Black Sea fishermen were no longer paid to oil the cormorant eggs and so numbers had increased. Through this learning experience he really *knew* that a major source of the problem lay elsewhere and that whatever they did in the Hula Valley was just a kind of holding operation for mitigation rather than a real solution.

INPA REPRESENTATIVE AND FISHERMAN'S REPRESENTATIVE	
<i>AGREE</i>	<i>DISAGREE</i>
<ul style="list-style-type: none">• No.of cormorants should fit the carrying capacity• Today the number of cormorants in Israel is higher because of fish ponds• The problem requires management• Scaring, stress, limited hunting and reciprocal management in breeding areas• Cormorants should be moved to Kinneret and the Mediterranean Sea• Great cormorant is not endangered	<ul style="list-style-type: none">• Who is responsible for the damage the birds do• Chasing from natural reserves – INPA “no” fishermen “yes”• Ammunition – INPA “ no lead, other non toxic methods, fireworks” Fishermen “lead or anything else – shoot them (but fireworks are of course OK – if it works)

Conclusions

- More research: cormorant migration routes and breeding sites (ringing*)
- Request: control the population in the breeding sites
- Better flow of information
- Keep talking

* It is interesting to note that during the Case Study meeting, mention was made of Italian ringed cormorants over-wintering in Israel. However, it appears that the Ukrainian ringers had actually used some Italian rings on some of their birds. This highlights both the need for very accurate ringing records (at the international scale) but also the problems people 'on the ground' face in interpreting what they see and find.

Group 3

Hula Valley Case Study – local perspective

INTERCAFE :Rosemarie Parz-Gollner, Ger Rogan, Ion Navodaru, Vilju Lilleleht, Ian Russell

Local Stakeholders Ido Itzhaki, Yossi Levi-Ari & Jonathan Harari

Stakeholders	Needs	Interests
Fishermen (as individuals within the community)	Income from fishery <ul style="list-style-type: none"> – suitable markets & species – now and in the future Supply of water	System of support – framework in which to operate Long-term perspective
Kibbutz (community level)	Sufficient income to maintain organisation.	Maximising income – looking at alternative ways of using resources Looking after community Long-term perspective
Ecotourism business (including bird watchers)	Tourists Income	Maximising income from area Effective use of available resources – diversifying Maintaining wetlands Long-term perspective
Infrastructure (local economy) – hotels, shops, gas stations, etc.	Visitors Income – sufficient to cover investment costs	Maximising income Framework for local development Effective use of resources Long-term perspective
SPNI – Society for Protection of Nature in Israel (NGO)	Meet objectives, Sustainable ecosystems	Preserve ecosystems – wetlands, etc Managing resources effectively Balancing interests Raising awareness of issues
Educators – schools, universities	Sustainable ecosystems	Training people Raising awareness of issues Long-term perspective
Academia – scientific research	Income Knowledge	Understanding issue – the facts Communicating findings – at appropriate level Advising policy makers Scientific reputation
Local council	Income – taxes Meet requirements of local community (legal responsibilities)	Achieving balance Sustainability Long-term perspective

	Balance income & delivery	
INPA	Meet objectives, Govt directives & international obligations Sustainable ecosystems	Resolving conflicts – managing problems Preserve ecosystems – wetlands, etc Managing resources effectively Supporting research
Ministry of Agriculture	Effective delivery of Govt policy	Sustainable use of resources Viable farming and fish producing/catching industries Effective Regulation Meeting national & international targets & obligations World & local markets Long-term perspective
Ministry of Environment	Effective delivery of Govt policy	Sustainable use of resources – environment, biodiversity Effective use of water Meeting national & international targets & obligations Long-term perspective
General public	Basic requirements for livelihood – food, housing, infrastructure, education	Community – local & national Environment & biodiversity Long-term perspective
Media	Stories Conflicts! Income	Issues of interests to readers/listeners/viewers

OUTCOMES

What has worked well?

- Information / Communication / Organisation – common goal.
- Co-ordinated efforts have been key to the success. Management depends on local agreements – varies from area to area. Cost of scaring effort has reduced progressively. Know how to do the job of scaring – timing, location, etc – getting better every year. Generally recognised that use of lead is a bad thing.
- “Fish restaurants” – use of trash fish appears to be a great success for pelicans (which feed and then continue their migration). Not for free - trash fish not available all year – not growing in winter. Need collecting & moving.

Someone has to pay for this. Ministry of Agriculture pays for movement (not the collection). Media used to communicate the story – lots of interest from public but fishermen embarrassed and complained (at least initially).

- Perceptions have changed – many fishermen accept ‘reasonable numbers’ of birds.

What hasn’t worked well enough to recommend?

- “Fish restaurants” - Cormorants are present all winter. So no solution in this case. Could actually encourage birds to stay in the area and therefore keep pressure up on valued fish species.
- Started local management without long term plans to assess what implications might be. Even now there is no long-term view (e.g. due to changes in situation)
- Need to recognise that people can/will always make mistakes or change their minds.
- Adverse publicity – originated from newspaper article. e.g. parasite transmission by birds – outcome was very bad – market severely impaired – really bad issue. Caused bad relationship between some stakeholders.

Barriers & opportunities for disseminating Hula Valley success elsewhere?

- Can’t endlessly relocate birds – have to feed somewhere unless policy is to kill birds.
- Efficacy will depend on geographic location - depends on alternative foraging being available (HV have the Mediterranean Sea & Lake Kinneret). Is also applicable in another pond farming area (Beit Shean Valley), but might not be an option for more inland sites.
- Inability to diversify to other more valuable fish species – environmental constraints and legal controls on use of non-native species.
- Lots of opinions in Israel (you are likely to hear many views on a single issue) - so personal opinions are a barrier. Beliefs and perspectives stronger than facts. Brings us back to human perspectives and need for education/awareness.
- Scaling up to a larger area with diverse fishery/habitat types likely to be a problem given the need for effective communication & coordination of scaring/deterrents as used in HV.
- If INTERCAFE workshop has helped in any way, might facilitate better communication / co-ordination / understanding / at other sites.

Policy development – what contribution could HV story make?

- Information / Communication / Organisation – common goal.
- Fundamental constraint – Water. This is one key to any policy development. The national water policy, as expressed regionally, can have diverse effects on fisheries management in the various fish-growing regions of the country.
- Much stronger message if can establish consensus views – also better if have engaged with relevant authorities/stakeholders in reaching these views. HV provides good example of effective communication of ideas and benefits of co-ordination between stakeholders.
- Awareness of biodiversity issues – different approaches necessary for Great Cormorant, Pygmy Cormorant and pelicans. Recognise fish under the legislation
- As indicator of wider trends within the country as a whole – e.g. smaller businesses more vulnerable so shift towards bigger businesses with more influence & power.
- Importance of wetland areas (including managed waterbodies) in maintaining biodiversity and helping to support ecotourism.
- Wider dissemination to inform policy/management in other areas/countries (e.g. Saxony).
- Fishermen & pond production going down progressively - in HV in particular, but also in Israel as a whole. A variety of issues are affecting viability of farms – birds are just one factor. Also have market issues (declining demand for carp), disease, increasing production of marine species, water quality and availability, etc.

General Points

- Fishermen have very different views on HV ‘solution’ – some agree relocation of feeding to Lake Kinneret not a problem, but others don’t agree and say it is NOT a solution.
- “Fishermen don’t want to be confused by facts!” applies to all stakeholders!
- Possibility of misinformation/misinterpretation – e.g. communication of results/findings to people on the ground
- Fishermen & pond production going down progressively in HV in particular, but also in Israel as a whole. A variety of issues are affecting viability of farms

– birds are just one factor. Also have market issues (declining demand for carp), disease, increasing production of marine species, water quality and availability, etc.

- Recognise that problems are man made – we made the environment – and made attractive food sources. Can't expect original landscape to be restored Therefore there is an education issue.
- Note that fish covered indirectly in EU legislation – e.g. HD, WFD
- Biodiversity - who is responsible? Who are stakeholders? Humanity as a whole? Should have national/regional perspective on this.

Group 4

INTERCAFE: Bruno Broughton, Thomas Keller, Linas Lozys, Nils Rov, Pekka Salmi

Local stakeholders: Ofer Sivan (Director of conflict resolution group for the Upper Galilee Farmers Association. Works on cormorants, cranes, etc.), Asaf Kaplan (regional ranger for INPA. Provides answers to conflicts in S. Jordan valley (was in Hula valley five years ago), Dan Mires (aquaculturalist in kibbutz. Former head of aquaculture, Israeli Ministry of Agriculture)

Who are the Stakeholders?

- Upper Galilee Farmers Association
- Other fish farmers' representatives
- Nature and Parks Authority
- Fishers
- Society for the Protection of Nature in Israel
- Israel's Dept. of Fisheries and Aquaculture
- General Public

Needs and Interests

- Funds in order to enable the current campaign in the Hula valley
- Interests need to change according to different stakeholders
- The protection of nature

Ofer Sivan

In living memory cormorant number declined then, eight years ago, they rose again, causing problems to fish in fish ponds. Before action began, has about 5,000 cormorants roosting overnight in trees outside the Hula Valley nature reserve.

Guards were placed on each fish farm & scared the birds with fireworks at night (various noises & colours), detonated by remote control – much cheaper than bullets. After just one month, all the birds were roosting inside the nature reserve.

By the year 2000, 9,000 cormorants were roosting in this way, with about 5,000 visiting the fish ponds. So further scaring was undertaken, backed by some shooting to kill. By 2005 (4th year of action) 1,500 cormorants were roosting in the nature reserve at night, of which 200 tried to feed at the fish ponds each day; the remainder fly each day to feed at Lake Galilee, 50km away. The 'missing' birds now both feed and roost at Lake Galilee.

\$100k used to fund the anti-cormorant campaign, contributed by fish farmers. By 2005, the sum had shrunk to \$8-10k, a consequence of the success of the campaign.

Main needs are help and money! However, cormorants are no longer the main problem as fish production is in decline – diseases, low water temperatures, etc.

Asaf Kaplan

There are two main nature conservation organisations in Israel, both of which act to protect nature. In recent years there has been a large agricultural crisis in Israel – some

farmers are now involved with tourism (ecotourism, fishing tourism) & the main conflict is between tourists and farmers.

Kibbutz used to grow its own food, but now farmers are involved with agriculture and tourism.

Because nature conservationists and farmers reached a solution regarding cranes, this helped productive negotiations between fish farmers and nature conservationists. Academics came in and collected data, so the facts are no longer in dispute. Therefore, action was possible.

The situation is different elsewhere. In the Bet She'an Valley a variety of methods were tried to control cormorants, including farm-by-farm, co-ordinated scaring. This worked well, aided by local co-operation, but was hugely expensive. (Note: there used to be 1,500 cormorants in the area, roosting in Jordan, nearby; now there are 1,000 birds, despite spending a million shekels/year, some of it by the Israeli government).

Dan Mires

The problems in the Hula valley are minute in comparison to other areas, and the solutions are only really relevant to this area. All aquaculture has suffered constraints, especially over the cost of water (which used to be free but has to now be bought). There is concern over the pollution of Lake Galilee, which is largely derived from nitrates from the now-dry area in Hula Valley, and the need to protect the lake from predators e.g. channel catfish, which orthodox Jews will not eat as it bears no scales.

It should be remembered that Lake Galilee is first and foremost an extremely important source of potable water, and the water quality is monitored by the Israeli government (must be no increase in nitrates & phosphates). However, it is also used as a commercial fishery, largely by poor people, whose livelihoods had been cut by 50%.

Most solutions to cormorant conflicts are local ones, even if they are replicated elsewhere. What works best is scaring to deter cormorant feeding by co-ordinated action. However, given that scaring merely moves the problem elsewhere, really need action at a pan-European level. (Bruno & Thomas explained why this was difficult).

A review of past and present status

Past

- Roosting of cormorants in fish farm area
- Excessive predation and economic damage
- Scaring away birds

Present

- Enforcement of an active campaign
- establishment of new feeding grounds
- encourage birds to move to other feeding grounds
- allowing birds to roost in the nature reserve

What should NOT be done includes:-

1. Do nothing!
2. Extend the use of nets. There have been problems over the entanglement of birds, leading to prosecutions.

Evaluation of the Project

- possibility of growing carp in the winter
- reduction of costs
- collaboration on cranes helped to establish trust between nature authorities, scientists and fish farmers
- conflicts were dealt with internally
- Lake Agmon Project supports the ongoing cormorant project
- Enables the use of non-lethal methods that are more acceptable
- Other problems - market, disease and water temperature

Group evaluation

- the Hula Valley Project may not be applied elsewhere
- it may have shifted the problem elsewhere
- the project may nevertheless have solved the local problem
- regional collaboration proved successful
- an international dimension is required

Group Discussion

The group discussed the statements of the local stakeholders UGFA, INPA and KA (see pages 21-32)

Dan reported that there is no consensus on cormorant management. the two ministries responsible for nature conservation and fisheries do not work together. Instead they “bend each others arms”.

Dan felt that INTERCAFE’s role should not be to look at lots more case studies; need to write statements or recommendations to inform policymakers.

Nils thought that people had the right to solve their own problems on their own land/in their own countries.

Thomas highlighted the need to look at what could be achieved, rather than hypothetical solutions.

It was agreed that the local situation does often (not always) apply elsewhere. However, the ‘bottom line’ was that there is no common strategy or concept for the management of cormorant conflict.

Group 5

INTERCAFE: Trude Borch, Redik Eschbaum, Mindaugas Dagys, Vilmantas Greiciunas, Daniel Gerdeaux, Zeev Arad

Local stakeholders: Names not recorded

Hula Valley

- Why did we come here? Because Hula Valley was a success story on the solving of a cormorant-fisheries conflict
- What have we learn about natural resources, stakeholders, stakes, problems, possibilities and conflicts?
- After getting more info: Do we still consider the Hula Valley a success story?

Need to consider the goals. - *What can be learned from the Hula Valley case?*

- *The History of the valley*

- The drainage lasted from 1951 to 1959
- Reflooding lasted from 1990 to 1994
- 1963 nature reserve
- 1963 SPNI established (nature protection NGO)
- Cormorants started becoming a problem in the last part of the 1980ies

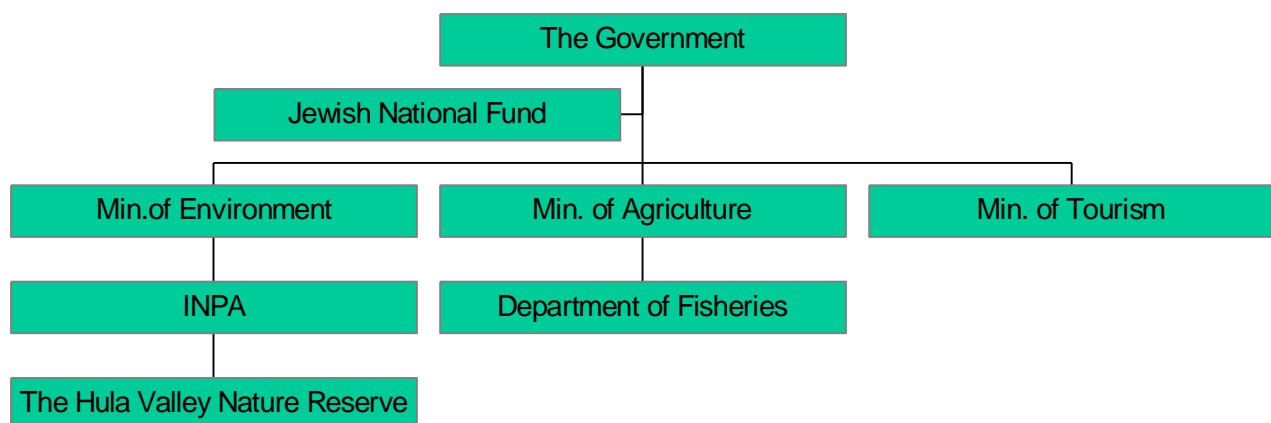
- *The Setting*

- Galilee Region
- From Mediterranean to "tropical" climate
- 8,7 % unemployment rate in Israel, lower in the Hula Valley?
- No lack of work-force
- Change in kibbutz structure

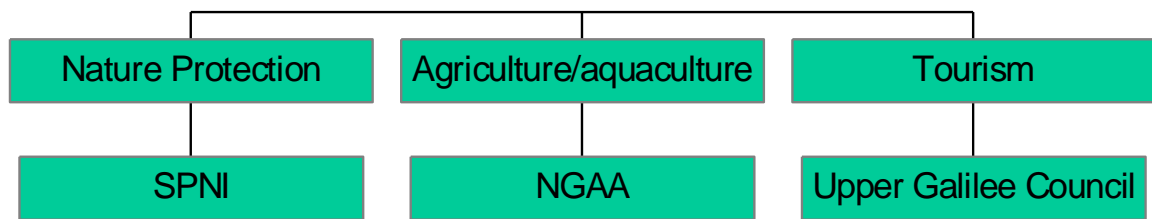
- *Nature*

- High biodiversity in avian fauna (250 bird species)
- Low biodiversity in fresh-water resources (few native species, mainly introduced)
- Flora – introduced species
- Water is a scarce resource

- **Government structure**



- **Stakeholders**



- ***Aquaculture***

- A fairly young industry, from the late 1940ies in the Hula Valley
- Down from 400 to 270 ha ponds
- Annual production – 8 tons pr ha (very intensive)
- NGAA The Northern Galilee Agriculture Association.
- Market challenges – price going down
- Subsidising going down

- ***Nature protection***

- The Ministry of environment
- INAP Israel Nature and Parks Authority
 - enforce nature protection laws (rangers)
 - provide scientifically based management advice
- SPNI Society for the Protection of Nature in Israel
 - NGO, established in 1963, education/field trips

- ***Tourism***

- Mainly national visitors to the region
- Kibbutz restructuring (more small-scale tourism)
- 3000 zimmer in the Upper Galilee and Golan Heights
- Tourism organized through the Council of Upper Galilee+ JNF –hotline for tourism information
- Recreational tourism (Bicycling, skiing, bird-watching, hiking, some hunting & recreational fishing)
- Mt. Hermon (3 lifts, 2 for skiers)
- 300 000 stay overnight (mainly weekend-trips)
- 18 000 visitors to the Nature Reserve (100 000 next year? 3D movie)
- Scientific institutions
- The Technion and Haifa University
- INPA
- The Institute for Lake Research – located by Lake Kinneret

- ***Is the Hula Valley a success case?***

- Have to take the goal of the project into consideration to be able to evaluate this
- YES! ”The fishermen accepted the Hula Valley Nature Reserve”
- YES The conflict between cormorants and fisheries is reduced

- Reduced costs
- Increased income because can start winter production - better water supply and market possibilities
- Success and the question of scale
- With migratory avi-fauna, success in one locality may imply environmental disaster or stakeholder conflicts in other localities

- ***The Hula Valley Case – a success on a local level only***
- Lake Kinneret commercial and non-commercial species + one endemic fish species (lavnun)
- No data on what has happened in Lake Kinneret before & after stocks of cormorants were dislocated there
- The government use Lake Kinneret as an experiment lake (introduce different fish species, have the fishermen remove sardines). Is this monitored?
- 191 scientific journal publications found on "Lake Kinneret" as the search word (only 5 on fish, 0 on birds)

- ***Possible future problems:***
- Lake Kinneret fishermen (decrease in annual catch from 2 200 to 1 100 tons from 1990 to 2004)
- Water supply from the Lake Kinneret
- The ecological status of the Lake Kinneret (environmental/conservation interests)
- Cormorant – fisheries/aquaculture conflicts in other regions
- Pygme cormorants
- Tourism pressure in the Hula Valley?

- ***What can be learned from the Hula Valley case:***
- Communication
- Timing-right information to the right time
- Involve all stakeholders (transparency)
- Co-operation and coordination between stakeholders
- Continual monitoring of the situation
- Not necessary to kill to solve conflicts on a local level
- Knowledge about technology (scaring, nets)

- ***The need for scientific based knowledge to identify and solve human-wildlife conflicts***
- "We will face different challenges in the future"
- From: gut-feeling, speculation, loose thoughts
- To: real evidence, real facts, comparable time-data-sets,
- Scientific knowledge as input in economic valuation and comparison
- Fish consumption by birds
- Economic loss in fisheries as the result of bird consumption of fish
- Economic value of the existence of cormorants (secure biodiversity for future generations)
- Economic value of the existence of cormorants for the tourism industry

Group 6

INTERCAFE – Ketil Skogen, Michael Andersen, Petr Musil, Josef Trauttmansdorf, Robert Gwiazda

Local Stakeholders: Names not recorded

Hula Valley

Positive aspects of the Hula Valley (what has worked well)

- flexible
- grew out of local context
- participants have a standing in local communities

Minuses (what has not worked well)

- exporting the problem to other parts of Israel
- missing the 'big picture' of cormorant-fish interactions elsewhere
- can't address the trans-national nature of the problem

Possible next steps

- devise formal local management arrangements
- policy level always the most important
- Advice should be directed at local actors not government agencies

Group 7

INTERCAFE: Mennobart van Eerden, Timo Asanti, Loïc Marion, Henri Enström

Local stakeholders: Names not recorded

Bottom up versus top down approach for conflict resolving

Options for resolving cormorant-fishery conflicts in Israel

- a) Control population in Ukraine, increase effort in Israel, pact between the two countries. (high costs, difficult negotiations, 75% reduction ~ 150,000 birds)
- b) Give up fisheries in Hula and concentrate on other ways of earning income: agriculture, horticulture (loss of wetland habitat, effect on other species)
- c) Cormorant-oriented management at the spot of interference, taking crane and pelican examples further. Optimise habitat and species management [cormorant, water quality, fish]. (Extended wetland development, increasing carrying capacity for fish and fish eating birds)

a) This option highlights Ukraine as a possible source of the cormorant problem. However it would require a high level of negotiation and agreement between the Ukraine and Israel. A lot pressure would be need to be applied as there would be no mutual benefit for the Ukraine to invest resources to tackle cormorants as they do not have a cormorant problem. Rough calculations suggest that in order to see a noticeable reduction of cormorants in Israel around 150,000 would need to be killed.

b) This option would likely have significant effects on other species such as waders, raptors etc.

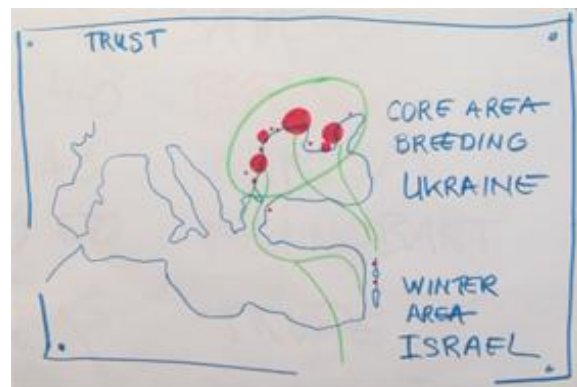
c) Taking management of cranes and Pelicans as an example. The cranes are moved from surrounding farmland and fed at Lake Agmon. It is an artificial system but income can be made from visitors. This system may not attract cormorants but it does show that in order to devise a plan we have to know, ecologically, what cormorants need, see which birds are going to the Hula Valley, when they go and whether they are passing through the Hula Valley to go to Galilee. Can we give cormorants some space so they can be lured away from the most sensitive areas? Pelicans and herons could also be lured to these feeding areas (e.g. former ponds) and there would be a tourism value in restoring habitat to help save other sensitive areas. This could lesson the conflict

Observations

The Hula Valley case is:

- solution oriented
- stakeholder friendly
- a lot of information has been exchanged prior to the INTERCAFE meeting
- considerable amount of mutual trust (necessary for collaborative agreement over how to tackle the problem)

Map - core breeding area Ukraine, wintering area Israel



Group 8 – National Overview

INTERCAFE: Marijan Govedic, Mikael Kilpi, Stef van Rijn, Kareen Seiche, Manfred Enstipp

Local stakeholders:

Introduction

- 1975: Cormorants appear
- 1980s and 1990s: illegal shooting, data collection by INPA, fishermen complains

Confirmation of the problem

- 2000/2001, INPA sent one person for coordination

Stakeholders

- Fish pond owners
- Suppliers
- Israel Nature and Parks Authority (INPA) - national and international laws
- Green NGO's (Society for the Protection of Nature in Israel (SPNI), Human Nature and Law)
- NATURE
- ECONOMY = AGRICULTURE

Needs / Interests

- Economy (profit)
- Nature (Keep the fish ponds alive, Keep high biodiversity in area)

What worked well

- Use of non-lethal deterioration -> reduce the total cormorant population in the area -> reduce the expenses towards cormorants problem.
- Cooperation, use the real data
- Organisation
- Timing
- Fireworks

Not recommended

- Lethal methods (although shot cormorants are said to taste good)
- No cooperation, use of circumstantial evidence
- Bad organisation
- Bad timing
- No fireworks
- Feed cormorants with corn

How it started

- Pelican project

Take home message

- Recognition of the problem and agreement that the problem exists
- One person for particular area (name & phone number)
- Alternative feeding grounds
- Continued operation of fish ponds in area
- Publicise project strategies and success

Part (7) Field Trip report - 22 January 2006

(1) Visit to commercial fishponds in the Hula Valley

(a) Aquaculture ponds

Visit was to a pond farm which belongs to Kibbutz Baram (at northern end of the Hula Valley, near the town of Kiriat-Shmona), cultivating mostly Carp but also Silver Carp, Chinese Carp, Mulletts. Farms such as this have very marginal profitability for a variety of reasons including changes to the kibbutz ethos. There are also economic problems caused by the cheap import of some species of fish such as Chinese Carp.

Water here is too cold in winter (around 11°C) to grow Tilapia, which are valued much more than carp. With cormorant predation on top of this, these are real concerns over the viability of such farms. Farms here are radically different to those farms in the Bet Shean Valley further south. There the water temperature is higher, which facilitates the growing of a variety of fish.

Some ponds in this area have moved over to become orchards in the last year and perhaps, all the farms will stop fish production within the next couple of years. Wires and cables suspended above the ponds have been used to prevent pelican from landing.

(b) Anan Reservoir

Tamir Strod gave us a talk on the local situation at Anan Reservoir.

Anan Reservoir has an area of about 40ha. It contains 'second hand' water (from the surrounding area) where water is pumped some 800m into the hills. The Reservoir was about 10m deep at the time of our visit and the maximum depth is around 11m. The Reservoir produces around 400+kg per year – mostly Carp but also Grey Mullet and Silver Carp.

The Reservoir is very close to the Hula Nature Reserve. Birds roost in the Nature Reserve most of the day but leave to feed in the Reservoir – they have caused few



problems in the last two years because numbers are now much lower than before. It is important to note that this seems to be a very common theme – a Nature Reserve adjacent to a commercial fishery.

Smaller ponds at this fishery are completely netted over to protect them from cormorants and around 1,500 cormorants roost in the Hula Valley.

This year cormorants have been coming to the reservoir and eating 120-150g Mullet. Two weeks prior to our visit the Reservoir suffered severe oxygen depletion and all the fish moved up to the surface. All the cormorants concentrated their feeding at the

Reservoir and this was “a real war” – its probably over now that the oxygen problem has been solved.

In terms of cormorant deterrents, the farmers use fireworks and limited shooting – fireworks are set off every couple of hours to scare the birds and this can be a problem for the Nature Reserve.

Water payments were discussed. Water costs 1 NIS per cubic metre and for Carp:

Carp = 10 NIS/kg = 1.7 euo/kg – the cost to the fishermen (this is not clear!).

Farmers pay for water in small ponds in the Hula Valley but payment for the Reservoir water is more complicated.



Economics are critical here – quite a similar situation to the one INTERCAFE explored in Bautzen, Saxony. Economics is the main issue for the fishery and the Carp market is a critical one for the survival of the fishery. The cormorant is really a minor problem – but it is the most visible!

When the Hula Valley project was started, there were 8-9,000 cormorants in the Hula Reserve (as winter visitors between November to mid-March) and about 1,000 per day were feeding on surrounding aquaculture ponds. The flight time from the roost in the Reserve to the ponds is about 30 seconds, and birds would feed at the ponds for about 30 minutes at a time. The rest of the birds moved out to other fishponds, and around 50% of the birds flew the 25-30 km south to Galilee. In January around 90% of the birds were making foraging trips to the Sea of Galilee, implying that changes had occurred in fish availability in ponds closer to the Reserve during the winter.

During the Hula project, things changed. Now about 1,500 cormorants winter in the Hula Reserve and only about 200 appear to forage in the surrounding ponds now. Some birds now make daily foraging trips over into Lebanon and some go into the Golan Heights.

There was then some discussion of other human:wildlife issues. Some kibbutzim have fisheries, agricultural fields and cattle. There are many conflicts and the authorities are often seen as the enemy. Wolves are considered a conflict species in the Golan Heights (the area has the highest concentration of wolves in the world) and there are also conflicts over vulture poisoning, rodents, night herons, and power line collisions. At smaller ponds that can be netted over, there are sometimes problems with birds (particularly coots and herons) becoming entangled in the netting.

(2) Visit to Hula Reserve

Visit to interpretative centre to get a feel for the geographic location of the Reserve and its flora and fauna. The history of the Reserve was also presented, including the drainage of the area and its subsequent restoration. INTERCAFE participants were also shown a new educational tourist attraction, a 3-D movie explaining Israel’s and

the Hula Valley's importance as a migratory route for birds (see also Parts [2] and [3]).

(3) Visit to the Lake Agmon Crane Project

The following paragraph is taken largely from the Hula Agmon Project's "*The Migrating Birds' Paradise*" publicity brochure. In 1992, part of the Hula Valley was re-flooded and Lake Agmon Nature Reserve was formed (see also Part [2]). The Keren Kayemeth LeIsrael Jewish National Fund (KKL-JNF) donated many tens of



millions of NIS to the project, which has reinstated the course of the Jordan River so that it now flows into a shallow lake, Lake Agmon (Agmon means 'bulrush' in English). The project also replanted swamp plants that once grew in the region: bulrushes, papyrus and the cattail. Some 500 million birds pass through the area in spring and autumn along their annual migratory route between Europe and

Africa. Ever since farmers started growing peanuts, corn and wheat, the area has become a key site for Cranes (*Grus grus*) to stop and 'refuel' during migration. Nowadays, about 30,000 Cranes arrive in the Hula Valley each autumn and some 10,000 remain there for the winter. Hula Valley farmers together with KKL-JNF and other 'green' organisations sought ways to co-exist with them.

Field notes

On the day of INTERCAFE's visit there were some 15,000 Cranes in the Hula Agmon area, the previous month there had been 30,000 birds. It is thought that birds migrating to the Hula Valley are mostly from NW Russia (close to Finland) and that they fly via south Ukraine, cross the Black Sea, through Turkey, Syria and Lebanon. Some birds are probably from Finland and Sweden but most birds from these areas tend to migrate in a westerly direction heading south through Spain.

Twenty years ago (1988) there were about 1,000 Cranes in the Hula Valley but their numbers changed as local conditions changed. Drainage was started around 50 years ago, and 40 years of agriculture in the area resulted in many drainage problems. The peat soil is thought to have eroded to a depth of 0.5m due to the wind. This has contributed to the nutrient enrichment of the Jordan River. The area also became very dry and regularly suffered from underground fires in the peaty soil – some of which burned for several years.

The Lake Agmon area was the first wetland area to be reinstated in Israel. Although it is not exactly as it was in the past – a big lake with swamps – it is still a very special place. It now has a very high water table and a very new lake (Agmon). In the rest of the Valley there are around 100 km of canals, which create a unique wetland system. All agriculture has changed and new products are produced, including peanuts. Cranes used to merely pass through the area but with the availability of peanuts in late September and early October the birds now stay for 3-4 months feeding on peanut 'leftovers' (after the harvest).

If peanuts are not available, the Cranes go out to other fields (e.g. winter wheat) where they can damage newly-growing crops. In 1999, Cranes were estimated to have caused some 1.2 million NIS worth of direct damage to seeds in the ground (mainly chickpeas). In addition some 60,000 NIS were spent that year on chasing the birds off vulnerable fields – but this proved inefficient. The following year an alternative feeding project was initiated and since then there has been no crop damage. There is still a financial cost to scaring the birds from agricultural fields but now alternative feeding sites are available for the Cranes to move on to. The whole project has cost about 700,000 NIS per year, including the provision of food for the Cranes and manpower to scare birds off commercial crops. Overall, the project saves crop losses which could (potentially) reach many million NIS each year.

The Hula Agmon Crane project also attracts a large number of human visitors (ecotourism) to Lake Agmon who come to see the Cranes. Indeed, Lake Agmon and its Cranes were the cover article of *Atmosphere*, the El Al Israel Airlines in-flight magazine during January 2006 at the time of the INTERCAFE Case Study. Annually around 200,000 people visit the Reserve, bringing an very appreciable income to the area. Thus the whole project is seen as being economically profitable.

Although there are some ethical problems surrounding the issue of feeding wild migratory birds, and it would not be the first option for Crane management, there is no choice but to use this method to avoid the conflicts and economic/agricultural damage seen before the programme started. Cranes are often offered maize (high calorific value) as an alternative food birds are not provisioned in this way until most have moved through the Valley after stopping-over there briefly. The supplementary feeding period is thus restricted, more or less, to those birds that would ‘naturally’ overwinter in the area. Financial compensation has been considered but was considered to be a “bad method” and was never initiated, mainly due to lack of a sufficient funding source for compensation money – government agencies preferring to pay for prevention rather as compensation for losses.

Crane numbers and distribution are monitored weekly over the whole Hula Valley and the numbers of birds in different habitats and on different crops are recorded. The project also promotes other avian research including investigations of bird migration. Nest boxes were seen widely throughout the Reserve – they are used by Barn Owls (*Tyto alba*) as “an effective method to control rodent populations” in alfalfa fields without the use of rodenticides.

When asked what could be done to improve the Hula Agmon Project, the answer was “by making it even cheaper to run.”

Appendix 1: Agenda



INTERCAFE@Hula Valley
January 21-23rd 2006
Hotel Pastoral, Kfar Blum, Israel



<http://www.intercafeproject.net>



INTERCAFE: Conserving Biodiversity - Interdisciplinary initiative to reduce pan-European cormorant-fisheries conflicts

INTERCAFE Case Study 1: Cormorant-fishery conflict management in the Hula Valley, Israel

Expected arrival of participants: Friday, 20 January 2006

Landing at Ben Gurion Airport (Tel Aviv)

Transportation (approx. 2.5 hours) to Hotel Pastoral (Kfar Blum in the Hula Valley)

Friday 20th January

DINNER from 19.30pm

DAY ONE (Saturday 21st January)

08.00 Breakfast

09.00 Opening session with Dave Carss and Scott Jones. Welcome and Introduction to Case Study.

10.00 Ido Izhaki (University of Haifa): *"Bird migration in Israel and the ecology of the Hula Valley"*

10.30 Ofer Sachs (Ministry of Agriculture, Dept. of Fisheries) and Amitai Geva (Ministry of Agriculture, Extension Services): *"The freshwater fishery Industry in Israel"*

11.00 Coffee break

11.30 Simon Nemtzov (Israel Nature and Parks Authority): *“Managing wildlife-human conflicts: the Hula Valley as a case study”*

12.00 Ofer Sivan and Amnon Nir (Northern Galilee Agriculture Association): *“The Hula Valley fishermen’s viewpoint”*

12.30 Ohad Hatzofe (Israel Nature and Parks Authority): *“Cormorants and pelicans in the Hula Valley”*

13.00 Discussion

13.15 Lunch

14.15 Integrated working session with INTERCAFE participants and invited stakeholders - facilitated by Scott Jones.

16.15 Coffee break

16.45 Integrated working session with INTERCAFE participants and invited stakeholders - facilitated by Scott Jones.

17.45 Plenary session with Dave Carss and Scott Jones

18.00 Dinner

18.30 INTERCAFE MINI-CONFERENCE (Night school)

18.30- 19.00 Work Group 1 (20 minutes presentation, 10 minutes discussion)

19.00- 19.30 Work Group 2 (30 minutes presentation, 10 minutes discussion)

19.30- 20.00 Work Group 3 (30 minutes presentation, 10 minutes discussion)

20.00- 20.15 Plenary with Dave Carss

20.15 Dinner at the hotel

DAY TWO (Sunday 22nd January)

FIELD TRIP AND CONFERENCE

07.30 Breakfast

08.30 Visit to commercial fishponds in the Hula Valley. Meet with local fishermen.

10.30 Visit to the Hula Nature Reserve (with Yonatan Harari and Yifat Davidson from the Israel Nature and Parks Authority)

13.30 Lunch at the Hula Nature Reserve

14.30 Guided tour of the Hula Restoration Project (“Agmon”) and the Eurasian Crane Project.

17.00 Return to hotel and coffee break

19.00 Dinner at restaurant

DAY THREE (Monday 23rd January)

07.00 Breakfast

08.00 Opening session with Dave Carss and Scott Jones
Integrated working session with INTERCAFE participants and invited stakeholders - facilitated by Scott Jones.

10.00 Coffee break

10.30 Zafir Rinat (Ha’aretz Newspaper): *“Using communication media”*

11.00 Nir Becker (Department of Economics and Management, Tel-Hai College):
“Economic aspects of the conflict”

11.30 Zeev Arad (Technion University): *“The role of basic science in conflict management”*

12.15 Buffet Lunch (posters will be on display)

13.30 Integrated working session with INTERCAFE participants and invited stakeholders - facilitated by Scott Jones.

15.30 Coffee break

16.00 Integrated working session with INTERCAFE participants and invited stakeholders - facilitated by Scott Jones.

17.30 Plenary session with Dave Carss and Scott Jones

17.45 Work Group meetings

19.00 Subgroup meetings (can be continued after dinner)

20.30 Dinner at hotel

Optional post-meeting tour on Tuesday 24th January

Appendix 2: Work Group activities

Work Group 1: Ecology

No additional notes available

Work Group 2: Conflict Resolution and Management

WG2 worked on four presentations:

(1) Ian Russell gave an overview of the state of the groups work on the definitions issue:

WG2 – Definitions:

- Objective – common understanding
- Terms identified so far:
 - favourable conservation status
 - sustainable fisheries
 - serious damage
 - successful conflict resolution
- Impossible to define in a few lines – complex issues / open to interpretation / views can vary!
- Ultimately for courts to decide

Approach:

- Draw on authoritative sources – e.g. EU Directives, UN, FAO, Birdlife International, ICES & REDCAFE
- Provide ‘balanced’ review as one of the INTERCAFE outputs
- Discussed within WG2, text developed & summary included in draft Saxony report

What Next?

- Need views of whole group:
 - Feedback on text
 - Have any Countries/States adopted working definitions for management purposes? (e.g. Simon’s definition of ‘success’)
 - If so, useful to document this?

New management methods:

- R&D on fish refuges (i.e. Ian’s cages)
- Some very encouraging results
- Should provide another useful management tool in some situations
- Key objective has been providing accessible information for stakeholders
- Work is ongoing

Ongoing objectives:

- Modelling – decision support tool
- How many - carrying capacity & effective range
- Spatial deployment issues

- Applicability for different fishery types
- Benefits for fisheries:
 - still waters
 - rivers

(2) Daniel Gerdeaux gave a short summary of his questionnaire on the legal status and management of the cormorant in Europe:

Information from most of the European Countries:

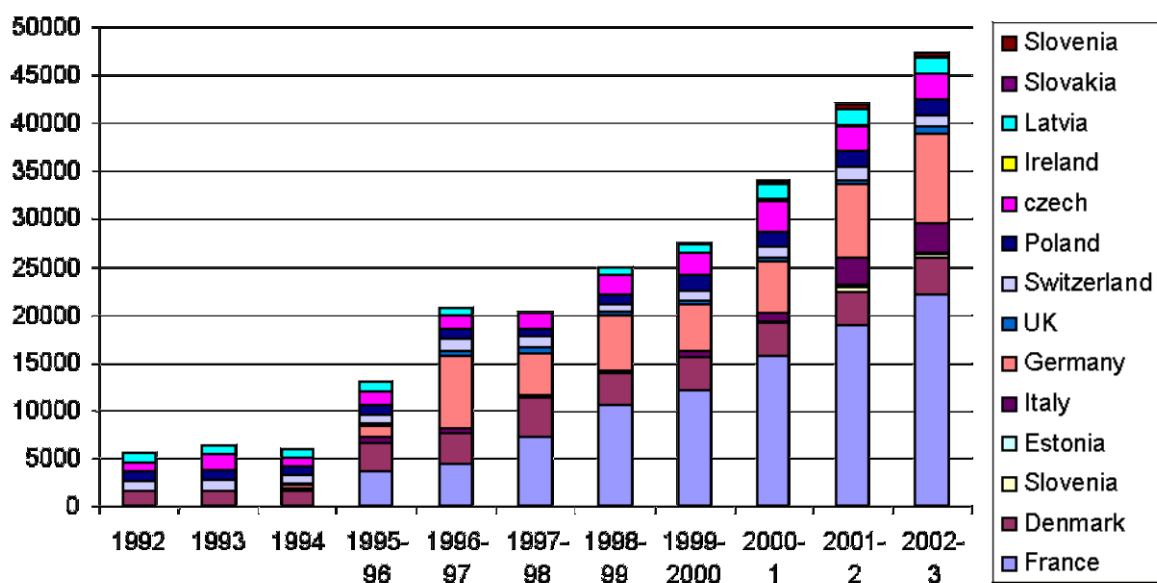
- Missing data till now from:
 - Austria
 - Portugal
 - Spain
 - Sweden

General trend: progressive shift toward less protection.

Two examples:

- France:
 - 1992 fish ponds
 - 1995 shots on roosts, first national quota
 - 1997 goal = stabilization of wintering birds (75000) annual increase of the quota
- Denmark:
 - 1992 shoot 100m around fishing gear, allowed to avoid no new colony
 - 1995 No new colony on land owned by the ministry of environment
 - 1997 distance 500m
 - 2002 distance 1000m, oiling of eggs

Number of killed cormorants in Europe 1992-2003:



(3) Petr Musil and Kareen Seiche reported on financial compensation of cormorant damages in the Czech Republic and Saxony (eastern Germany):

(a) Petr Musil: Compensation of damages caused by Great Cormorant (*Phalacrocorax carbo sinensis*) in the Czech Republic

p.musil@post.cz

Department of Zoology, Fac. of Sciences, Charles University, Praha, Czech Republic

The breeding population of Great Cormorant was established in the Czech Republic in 1982. In 1998-2000, the breeding population was stabilized between 178 and 184 pairs. In 1999, numbers of migrating Cormorants was estimated at 10,000 – 14,000 birds and numbers of wintering Cormorants at 4,000 – 6,000 birds.

This population status affected unofficial “management plan” for Great Cormorant in the Czech Republic, which was based on:

- full protection of breeding population and compensation of damages caused by breeding population
- to allow flushing and shooting migrating birds & no compensation of damages caused by migrating (and wintering) birds

Therefore, the Act no. 115/2000 entitled “*Compensation of damages caused by selected especially protected species*” was issued in the 5th April 2000. The following species were included in this Act: European Beaver *Castor fiber*, Fish Otter *Lutra lutra*, Great Cormorant *Phalacrocorax carbo*, Moose *Alces alces*, Braun Bear *Ursus arctos*, Lynx *Lynx lynx*, and Wolf *Canis lupus*

In case of Cormorants this Act cover only damages caused on fishes stocked for economical purpose in fishponds, fish farms, fish hatchery etc. between the 1st April and 15th July (i.e. only during breeding season). Requests for compensation have to be addressed to Department of Nature Conservation of Regional Government or to Landscape Protected Area/Nature Park Authorities no later than 6 months after start of damages. All requests for compensation have to be confirmed by “expert review”.

The damages were calculated as multiple of:

- **total number** of foraging Cormorants
- number of **days** when foraging Cormorants were recorded **during breeding season**
- average mass of **consumed fishes (Daily Food Intake)**
- **mean actual marked price** of consumed fishes

Nevertheless, the important change in conservation Act no. 115/2000 was adopted in the 29th November 2001, when paragraph limiting compensation damages only on breeding season was deleted. Therefore, the compensation is recently possible all year round on water bodies where fishes are stocked for economical purpose in fishponds, fish farms, fish hatchery etc.

The total amount of damages caused by Cormorants compensated by government was about 21,000 EUR (2000) and 55,000 EUR (2001), when this process covers only breeding population. In following years, the total amount increases up to 550,000 EUR in 2003 and 2004 when the compensation procedure was applied all year round esp. on fishponds.

In the autumn 2005, Ministry of Agriculture prepare new Novel of the Act no. 115/2000 which will allow to compensate also damages caused on running waters since 2006. This Novel tend to reflect increasing numbers of wintering Cormorants, which reached 10,000 birds in winters and 2003/2004 and 2004/2005.

Table 1: Compensation of damages caused by Great Cormorants in Czechia (Czech Republic) and Saxony.

Country	Czechia	Czechia	Czechia	Saxony, Germany
Period, years	2000 – -2001	2002 – -2005	2006 ≤ ???	1999 – - 2006
Fishponds	yes	yes	yes	yes
Rivers	no	no	yes	no
Breeding season	yes	yes	yes	yes
Non-breeding season	no	yes	yes	yes
Consumed fishes	yes	yes	yes	yes
Injured and stressed fishes	no	yes	yes	yes

(b) Kareen Seiche: Calculation of financial losses about cormorant damages in carp ponds in Saxony

Table 1: Calculations.

Month	Number of cormorants (results of cormorant monitoring)					
	1996	1997	1998	1999	2000	2001
Ø population size/ month	860	720	1,031	1,200	982	785
Ø population size/month + 25 % error= Supposed population size/month	1,075	900	1,289	1,500	1,228	981
-5 % reduction in consequence of the application of legal scaring technics	1,021	855	1,224	1,425	1,167	932
Cormorant days (Supposed population size/month x 275 d/ March - November)	280,775	235,125	336,600	391,875	320,925	256,300
Loss in kg (Cormorant days x 0,5 kg daily food intake)	140,388	117,563	168,300	195,938	160,463	128,150
Indirect Damages caused through stress and injuries (10 %)	14,039	11,756	16,830	19,594	16,046	12,815
Total loss (Loss in kg + indirect damages)	154,427	129,319	185,130	215,532	176,509	140,965
Financial loss in EUR	0.5 Mio	0.42 Mio	0.6 Mio	0.7 Mio	0.55 Mio	0.5 Mio

Table 2: Shooting single cormorants.

year	Ø population size/ month	Proposed shooting licenses	Permitted shooting licenses	Announced numbers of shot cormorants	Harvesting result in kg/ha	Total carp production in t
1995	920	278	115	100	623	2,980
1996	860	395	153	119	628	2,552
1997	720	570	257	196	639	3,020
1998	1,031	722	457	362	653	3,110
1999	1,200	1,041	568	466	645	3,140
2000	982	1,070	773	637	694	3,200
2001	785	1,103	913	648	645	3,010

Financial help for pond cultivation:

Basis amount for pond management in accordance with nature protection

200 EUR/ ha

Additional money for:

- no fish stocking 154 EUR/ ha
- no supplementary feeding 154 EUR/ ha
- low level of fish- stocking 103 EUR/ ha
- pond dewatering in long term intervals 103 EUR/ ha
- cutting of reeds in accordance with the guide lines of nature protection 26 EUR/ ha

Conclusions:

- What exactly happens in a carp pond and with carp pond management is unknown and we have to accept this, because it is not a question of too little research, it seems to be a problem of very complex events in nature.
- On the other hand we have a lot of many detailed information, may be more than we actually can apply in practice.
- We need good basis information about cormorant and fishery, but the conflict cannot be solved only on a scientific level.
- We need a forum for discussion between scientist, fisher men and politicians (for instance publication of researching results should be published not only in ornithological journals, but also in fishery journals)

Discussion:

K.: Fishermen claim indirect losses of 10%. This seems too high, but is taken as the upper limit for a possible financial compensation.

T.: What do you mean by indirect damages?

P.: Stress that leads to reduced growth.

B.: At first only money was given to fish pond owners. Now, a new law allows also paying for damages at rivers.

P.: Wild fish are publicly owned. But, there is fish stocking which is the reason for compensation of angling clubs.

D.: What is the total production of fish in ponds in CZ?

P.: Not known at the moment.

N.: How do you calculate loss?

T.: How reliable are estimates by fishermen? Do they tend to exaggerate?

P.: There is not so much overestimate as bird numbers are the basis for damage calculations. Ornithologists check the bird data provided by the pond owners.

(4) Robert Gwiazda: Conflict Cormorant-fisheries in Poland

Institute of Nature Conservation,
Polish Academy of Sciences
Krakow, Poland

There are ca. 9,300 lakes bigger than 1 ha in Poland. They cover approximately 317,000 ha. The most of them (ca. 80%) are located in Northern Poland. Roach, Bream, Silver Bream and Perch are dominant species in the fish community.

There are less than 700 ponds in Poland. Their filling area is ca. 40,000 ha. The most of them are located in Southern Poland. The main fish species in Polish aquaculture is Carp, making up more than 95% of the whole production.

At present there are ca. 40 breeding colonies of Cormorant in Poland. Northern Poland is a region where the densest population of Cormorants occur. Only a few of the breeding colonies are located in South and South-East Poland. The most of Cormorant colonies are located on lakes (ca. 60%). Only six, relatively small, colonies is located on fish ponds but Cormorants from more than other 10 colonies are able to forage there. About 30% of Cormorant colonies are protected in Nature Reserves.

During the last two decades the number of the breeding Cormorants in Poland have peaked from 1,470 in 1981 to 8,200 in 1992 and >15,000 in 2000. Annual growth rate was 11% per year.

The highest number of Cormorants (and fish predation) in southern Poland was recorded during migration. Cormorants stay in Poland from spring (February-March) to late autumn (November-December) at inland sites. The number on fish ponds or dam reservoir reached more than 2,000 individuals. Conflict Cormorant-fisheries is mainly on fish ponds and lakes.

Roach following by Perch are dominant species of fish by numbers in a diet of Cormorants in lakes and dam reservoirs in Poland. The percentage of species of the highest economic value (Sea Trout, Pike, Pikeperch, Eel, Vendace and Whitefish) in a Cormorants diet is small. Cormorants forage mostly on Carp on fish-ponds.

Cormorant has been strictly protected species in Poland since 1952. First legal reduction of nests was made since 1969, and legal shooting since 1984. Since 2004 this species is partly protected species.

The following management techniques are used in Poland:

- eliminating bird nesting sites (nests/tree removal)
- shooting of birds (except the breeding season)
- visual and acoustic disturbance of birds
- human patrol or simple human presence

Financial compensation of fish losses by Cormorants was not paid.

In 1990s 13 of 35 Cormorant colonies were reduced. Cormorant nests were destroyed mostly on fish ponds and lakes. Fish farmers destroyed or reduced colonies on fish ponds directly after their establishing. Regular Cormorant nests reducing caused leaving of this place by breeding Cormorants. But Cormorant nests reducing in one complex caused starting to breed in other places. Shooting cormorants has rapidly increased in Poland from the late 1980s. In 1987 135 individuals was shot and in 2004 – ca. 2,700 birds. Number of shooting is between ca. 40 – 75% of quotas.

Discussion:

J.: Who is shooting and paying for the shooting of cormorants?

R.: Not only hunters shoot but also guards with permits (permits cost money). Permit holders need to give a report on their activities.

I.: Who decides which cormorants are to be disturbed?

R.: A cormorant damage must be shown.

B.: Do cormorants mostly feed on common fish species?

R.: No. The cormorant diet does not reflect the fish community structure. Cormorants select for larger fish.

P.: Do cormorants feed on rivers?

R.: In Poland cormorants almost do not feed on rivers. There are no cormorants on rivers in winter.

P.: This is different in CZ even close to the Polish border!

R.: Cormorants on rivers might be a problem in Poland in future.

Re.: Is Ruffe consumed by cormorants in the Vistula lagoon?

R.: There cormorants feed on Ruffe and Round Goby.

Finally, Kareen Seiche gave a report on the Carp Pond subgroup meeting in Saxony after the INTERCAFE meeting in Bautzen, Saxony.

Aims of carp pond subgroup:

- Participants: Daniel Gerdeaux (France), Peter Musil (Czech Republic), Robert Gwiazda (Poland), Tamir Strod (Israel), Kareen Seiche (Germany).
- First step: to collect information about pond management and strategies to handle the cormorant problem in carp pond areas, what is similar, what is different?
- Second step: to analyse the effect of management strategies in relation to different conditions.
- Third step: to transfer successful strategies under local modification (example Hula Valley).

- For INTERCAFE- people: closer contact with stakeholders in the carp pond region, discuss problems together- to get a feeling, which kind of management could work.
- Our interest in Saxony: to show our stakeholders similar situations and problems in other carp pond regions, I would like to convince authorities to develop a strategy without compensation (in future there will be no money!) and to show our fishermen- they had good luck because of compensation, in other European region there is no financial help.

What did we do?

First day: Meeting with

- U. Weniger Saxon Ministry of Environment, responsible for fishery affairs
- M. Gruschwitz Saxon Ministry of Environment, responsible for nature protection
- G. Füllner Fishery administration
- G. Bräuer Office for Fish Health in Saxony
- R. Broddack Angler association in Saxony
- W. Hänsel Angler association in Saxony
- U. Popella Angler association in Saxony
- W. Stiehler President of Fishery Association in Saxony

Short presentation from France, Poland, Czech Republic, and Israel:

Field trip to a carp pond company to see the pond management in detail.

Second day:

- Visit a pond harvesting with longer discussion with the fisherman
- Field trip to search for several alternative feedings sites (big lakes = old open cast minings).
- Visit a fisherman in a former open cast mine, originally a trout fishery, but at the moment the water conditions are not suitable for trout and he is forced to search for alternatives.

Conclusions:

- At the moment the cormorant conflict in carp pond regions of Saxony is moderate, there is no need to have another management.
- If the money will be cancelled we need a good management and the Hula valley model is recommended under special modifications.

WG3: Linking science with policy and best practice

WG3 organised a discussion around the presentation by Trude Borch (below):

The implementation of scientific knowledge in policy

Studying the relationship between science and society may prove useful to look into the production, dissemination and consumption of scientific knowledge. All these phases imply some sort of interpretation; be it by scientists in the “laboratory”, by journalists in newspapers or by stakeholders or politicians as the end-users of scientific findings. Scientific knowledge may prove a major resource that can be mobilized in political interest-struggle. However, just as often, there are examples of available scientific knowledge being overlooked, not implemented or even rejected by interest-groups and politicians. There is much to be learned about power-relations from studying processes of implementation and rejection of scientific knowledge in societal interest-struggle and political decision-making.

Group discussion:

What are common aspects of human-wildlife conflicts

Urban vs rural

Humans vs wildlife

Educated-upstairs vs downstairs (different types of knowledge)

Experts vs laymen, women, persons, folk

Capacity building (or lack of)

Symbolic dimension (what do the conflict species symbolise to people?)

Social justice-rights

Tradition, livelihood

We were here first!

Their activity [has] more economic importance

Capital-used in conflicts

Institutional strength – top down

Myths e.g. German anglers = thieves

Gendered?

Scarce resources

Human vs human

Hierarchy of knowledges

Disrespect for complaintif-in denial

Clash of ‘value frameworks’

\$Economics\$

Following this discussion, WG3 then devised a homework list and other WG3 members have been invited to join these research themes

Research Question/themes for investigation:

1. Simon Nemtsov, Scott Jones and Susana Franca

Review of literature or cases of Human Wildlife Conflicts that have had some degree of success because of cooperative solutions

2. Scott Jones

Compile a bibliography of conflict analysis to provide a framework/toolkit

3. Rosemarie Parz-Gollner, Erik Petersson and Pekka Salmi

Review of existing Management Plans of focal or flagship species/habitats in own countries (e.g. Look at how they came about, what processes were involved, which stakeholders were involved, which stakeholders were excluded etc.)

4. Trude Borch, Dave Carss, Michael Andersen and Pekka Salmi

Examination of how scientific knowledge is/was incorporated into the Cormorant Management Plan.

5 Faustas Stepukonis and Jaroslav Bohac

A review of media articles in relation to human-wildlife conflicts for further analysis (please can you send relevant articles to Faustas)

Appendix 3. Israeli Participants in the Hula Valley Case Study (shaded boxes indicate INTERCAFE participants)

	Name	Name Hebrew	Position	Affiliation	e-mail	Mobile phone	Other phone
1	Dan Alon	דן אלון	Ornithologist	Director, Israel Ornithological Center, Society for Protection of Nature in Israel	ioc@netvision.net.il	052-3689603	
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4	Dan Mires	דן מירס	Former Director of the Department of Fisheries and Aquaculture	Ministry of Agriculture, Department of Fisheries and Aquaculture	isrjr@int.gov.il	052-3965809	
5	Amitai Geva	אמיתי גבע	Aquaculture Advisor	Ministry of Agriculture, Extension Services	amitai_geva@walla.com	050-6241543	
6	Ofer Sivan	עופר סיון	Director, Wildlife-Agriculture Conflict Resolution	Northern Galilee Farmers' Association	avnerk@galil-elion.org.il	050-7675153	
7	Amnon Nir	אמנון ניר	Wildlife-Agriculture Conflict Manager	Northern Galilee Farmers' Association		050-7344016	
8	Yaron Kruner	ירון קרונר	Wildlife-Agriculture Conflict Manager	Kibbutz Nir David		050-5481556	
9	Tamir Strod	תמיר סטרוד	Bird-Aircraft Hazard Operator	Border Collie Rescue, Inc.	tamir_strod@yahoo.com	050-4890921	
10	Zafirir Rinat	צפרייר רינת	Nature Reporter	Ha'Aretz Newspaper	zafirirr@haaretz.co.il	050-7333027	
11	Efi Naim	אפי נעים	Director of Agmon Project	Jewish National Fund (Keren Kayemet)	efin@kkl.org.il	050-7486980	
12	Yossi Lev-Ari	יוסי לב-ארי	Director of Natural History Museum	Kibbutz Dan	ussishkin@spni.org.il	052-3689636	

	Name	Name Hebrew	Position	Affiliation	e-mail	Mobile phone	Other phone
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24	Iftah Sinai	יפתח סיני	Ecologist of the Southern Galilee Region	Israel Nature and Parks Authority	iftachsi@netvision.net.il	057-7762082	
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26	Dotan Rotem	דוּתן רוּתם	Ecologist of the Carmel Region	Israel Nature and Parks Authority	haybar@npa.org.il	057-7762196	
27	Ben Rosenberg	בן רוזנברג	Regional ranger	Israel Nature and Parks Authority	ben_ros@yahoo.com	057-7762174	

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28	Asaf Kaplan	אסף קפלן	Regional ranger	Israel Nature and Parks Authority	asafk@npa.org.il	057-7762238	
29	Talya Oron	טליה אורון	Ecologist of the Northern Galilee Region	Israel Nature and Parks Authority	talya@npa.org.il	057-7762024	