



## Leadership for Fisheries Management Course August 16 – September 3, 2010

### *Themes of Training*

#### Ecosystem-Based Approach to Fisheries

The application of ecosystems approaches to fisheries management is an overarching theme of this leadership workshop. The Ecosystem-based Approach to Fisheries Management (EBFM) applies ecosystem based management (EBM) thinking to fisheries management by incorporating consideration of ecosystems into fisheries management decisions. The purpose of EBFM is to plan, develop and manage fisheries in a manner that addresses the multiple needs and desires of society without jeopardizing the options for future generations to benefit from the full range of goods and services provided by the marine ecosystem.

#### Leadership

The course is based on leadership development, focusing on transformational change at the individual through societal levels. As we move away from the failed fisheries paradigm of increasing effort, diminishing economic return and overfished stocks, a new vision of fishing is emerging -of catching less fish with greater value, less effort, and less habitat alteration. The changes occurring in the fisheries revolve around the shift from short to long term views; acknowledgement that these resources are limited yet renewable; that fish and fishermen can co-exist; that we are linked in the global food supply network and that ecosystems are the level of management action. This requires new processes for science and management, as well as engagement of the participants. Participants must experience change also. There is a shift from blame to more responsibility and engagement; bottom up vs top down and a focus on solutions rather than problems.

#### Team Work

Team building is a theme woven throughout each day and a major benefit of the three week experience. The bigger the things are that we want to do in the world, the less likely we can do them alone. The ability to work effectively in teams, to lead teams, to communicate and network among teams are essential skills if we are to have more sustainable fisheries worldwide. It is highly recommended that programs send teams of 3 or more to the training, so that they can take advantage of a rare focused opportunity to work together, live together and learn together, then have the critical mass to support one another in applying the new information and approaches to their work upon their return home. Participants will leave with a deeper level of appreciation of their own talents and those of their colleagues, practical skills in team work, personal growth and a deep bonding with other participants that is remarkable.

### *Purpose*



The purpose of this course overall is to assist you in developing a plan of action for bringing about changes in fisheries management. The course develops your leadership ability and wisdom based on knowledge. The final step is the application of this to your unique situation. You and your team will have several weeks to develop this plan, based on exercises provided during the sessions. You will present this to the group on the last day of the course.

### Major Modules

#### Day 1

##### **Fisheries Transitions: Challenges and Opportunities**

Brainstorming session by the participants on what challenges they are facing in fisheries management. These challenges will be discussed as opportunities for change – in approach, behavior and tools. They will set the stage for the three week session.

- ∞ **Tell us your story: Identify challenges in your fisheries** Each participant will tell their story to the group emphasizing the specific challenges and opportunities they face in managing the fishery. This will integrate some storytelling features that bring the story to life.
- ∞ **Action Plans:** This session will describe the expectation of the training to assist participants in developing action plans that are team based.

#### Day 2

##### **Ecosystem Based Approaches to Fisheries Management (EBFM\*, also known as EAF)**

The ecosystem based approach to fisheries management looks at a big system and the interactions of decision making. Fisheries are integrated systems – natural and human. The ecosystem based fisheries approach is: adaptive and incremental; takes into consideration both knowledge and uncertainty; considers multiple external influences and strives to balance diverse societal objectives. It applies Ecosystem-based management (EBM) thinking to fisheries management which takes into consideration maintaining ecosystem services and goods by conserving critical functions, habitats and biodiversity. This session will introduce the concepts of EBFM and how they are applied in the different areas throughout the workshop. Tools for doing EBFM will be introduced (ECOSIM/ECOPATH)

- ∞ **Introduce Participant Case Study: Application of EBFM approach** Using the elements introduced in the session on EBFM, each participant will describe their fisheries issues in detail using a guided workshop format.

\*(EBFM is the acronym used by the World Wildlife Fund and USAID; EAF is used by FAO and the regional fishery management councils)



## Days 3 and 4

### Leadership – the Empowerment Model

This course is based on the Transformative Leadership module of the Empowerment Institute of David Gershon and Gail Straub. “Most who begin this journey operate out of pure impulse with only their intuition to guide them. If their will is strong they persevere through the inevitable early discouragement, but often lower their expectation. Some begin resenting the people and culture when they encounter resistance. And some give up and act without conviction. This doesn’t have to be the experience of facilitating change. It can be done successfully and elegantly. What is most often missing is the knowledge of how to design and facilitate a transformative change strategy. In this training you will acquire the strategies of transformative change; the leadership skills to implement them; and fire for the soul to inspire your effort. You will learn the craft of transformative leadership. It is divided into three skill development areas: vision, strategy, and leadership. Vision is the catalyst to transformation — a description of a better way. You will learn how to cultivate your imagination and remove resistances to innovative and bold thinking; craft a compelling vision that deeply inspires you; refine this vision based on careful interpretation of feedback; and communicate it so that it’s aligned with the motivations of others. Strategy is the means of transformation. You will learn how to work with transformative change at three levels — individual, group, and institutional/cultural; develop empowerment strategies that help people overcome their fears and resistance to change; utilize a five-part strategy for transformative change; create a transformative strategy and implementation plan for an initiative of your choice; build cooperation amongst those necessary to move your initiative forward. Leadership is how the transformation will occur. To successfully implement a transformative strategy you need leadership skills capable of calling people to their highest performance. Through a series of exercises you will develop the skills necessary to bring forth the very best efforts of those from whom you have been entrusted with leadership. By the end of the training you will have the knowledge to affect fundamental organizational and community change.

- ∞ **Behavior Change and Diffusion of Change.** In 1992, the Food and Agriculture Organization of the United Nations developed a Code of Responsible Fishing that sets out principles and international standards of behavior for responsible practices. The Code establishes a baseline for change. Catalyzing behavior change is both a science and an art. Various premises about change and resistance to change will be discussed and modeled. Extension (or outreach and education) models are powerful methods of bringing about behavior change. Extension workers foster effective two way communication between stakeholders. This type of interaction engages and empowers stakeholders resulting in change. Change can only happen when: it is culturally appropriate, in agreement with self-interest; respectful of tradition, clearly beneficial and not economically risky. The principles and tools of extension will be presented in this session with exercises to practice and apply to local situations.



- ∞ **Fishermen’s Perspectives Dinner** Fishermen bring a unique perspective about ecosystems, species and systems. Their livelihood depends on their ability to balance the ecological, biological, economic and social components of the fishery. Several Rhode Island fishermen will share their story on moving towards sustainability while we feast on locally caught Rhode Island seafood.

## Day 5

### Starting with the product: Processing and Marketing in an EBFM Approach

- ∞ **Seafood Safety Hazards Associated with Seafood Products and Processing.** Fish and fishery products are in the forefront of food safety and quality improvement because they are among the most internationally traded food commodities. While thorough cooking destroys most harmful pathogens, seafood safety hazards remain. For example, raw oysters and clams have been linked to illness from *Vibrio vulnificus* and other pathogens. In addition to pathogens, other kinds of contamination can affect both farm-raised and wild-caught seafood. Countries vary in their use of vaccines, feed additives, and antibiotics for farm-raised fish and shellfish, and residues from these production inputs sometimes cause food safety concerns. Wild-caught seafood may be affected by other kinds of contamination such as histamines. This segment will cover some of the basics of seafood hazards.
- ∞ **HACCP** (pronounced “has-sip”) or *Hazard Analysis Critical Control Point*. It’s an effective way of ensuring the safety of food. It works by preventing food safety problems from developing rather than testing food after production to see if it’s safe. Part one includes making a list of things that can cause the food to be unsafe—we call this hazard analysis. Part two is deciding at which place in the production of the food the hazards can best be controlled—we call this the critical control point for that hazard.
- ∞ **Producing the Right Product:** What is the most effective use of the seafood that is harvested? Local consumption or export market? Fresh or frozen? This section will examine the relative costs and benefits of producing seafood.
- ∞ **Marketing the Approach:** How do you create a market incentive? What does certification mean to the consumer and the producer? The use of branding and ecolabeling as incentive and guidance for moving towards sustainability will be discussed and illustrated.



## Day 6

### Biological and Ecological Objectives

Without the fish, you have no fishery regardless of the societal objectives. A healthy ecosystem is fundamental to obtaining benefits from this renewable resource. This session will address unregulated and regulated growth of populations, as this leads to the logistic growth model. The logistical growth model to introduce the concept of carrying capacity (maximum biomass for a stock), and then will be used to develop the concept of surplus production, maximum sustainable yield (MSY) and the biomass at MSY. A brief descriptive overview of the various mathematical models used to estimate MSY and BMSY will be introduced. Finally, the use of age or length structured models will be discussed as a further development of the global biomass models.

### Development of Reference Points

Reference points are the outcome of various stock assessment models and address both the rate of fishing and the stock biomass, that were presented in previous sessions. The reference points are set at two levels, targets and thresholds or limits. The overfishing reference point refers to the rate of fishing while the overfished reference point refers to stock biomass levels. Control rules are used to illustrate a standardized rate of fishing and stock biomass simultaneously on a single figure. The standardized rate of fishing is the estimated fishing rate in a given year to the reference level of fishing, while the standardized biomass level is the estimated biomass level in a given year compared to the biomass reference level. The control rule allows the fishery scientist to describe the past trajectory of the fishery, and then to evaluate the effectiveness of alternative management strategies to return the fishery and the fish stock to a healthy state.

### Ecological Concepts

An ecosystem approach will require the monitoring and assessment of all aspects of the ecosystem. There are both ecosystem structure and function aspects to include, biotic, abiotic and human. What are the parts and pieces of an ecosystem, which ones are important to measure and how do we monitor them?

## Day 7

### Social Objectives

It is important to understand the human dimensions of fish harvesting, handling, processing and marketing. Social assessments can provide baselines on the social conditions of fishing communities—information that can be used later to assess performance in meeting certain social goals of fisheries management. Social assessments can also provide insights into how proposed



regulations may impact fishing communities. They can also be used to tailor management interventions to better suit local conditions.

There are a number of ways to collect relevant information—by engaging in rapid participatory appraisals, using existing information from a national census or published fisheries statistics, by conducting detailed household and individual surveys, or through a combination of these and other techniques. Information should be collected at the same scale at which management interventions are proposed—i.e., at scales ranging from the village level, to that of an entire bay, or for the nation as a whole. This session will examine various techniques used for data collection.

Population, Health and Environment ( PHE) is a development approach that supports the interrelationships between human population growth, human health and economic dynamics to improve the well being of people who depend on coastal ecosystems for food, income, livelihood and other goods and services. This approach, which has tangible benefits for coastal fishing communities, is best suited to countries with relatively high rates of population growth, which is related to the loss of marine biodiversity and coastal ecosystem productivity.

### **Economic Objectives - Development of Economic Policy**

Whether it is commercial or recreational fisheries, fisheries management involves not just how the resource should be used (i.e., catch rate, seasonal protection, etc) but also how to “control” the users’ behavior to be compatible with the intended resource usage. Command-and-control regulations failed because they often neglected the fact that these users are economic agents; their behavior is driven by economic incentives, such as profit maximization (commercial), utility maximization (recreational), or simply to satisfy the daily needs (subsistence). Users do respond to the regulations according to their incentive structure; thus, successful intervention strategies must proactively incorporate it. This session will focus primarily on the commercial fishery, and begins by have you understand why they behave the way do using simple economic concepts and demonstrate the outcomes of various policies using the experimental methods. The use of MEY (Maximum Economic Yield) will be introduced and explained. The session will also describe in detail how the market forces can be significant in shaping the fishermen’s behavior, which leads to the importance of value chain consideration. The goal of the session is that, by the end of it, you will be equipped with economic concepts that will allow you not only to anticipate how fishermen will respond to regulations, but incorporate it so as to design regulations that are self-enforcing, i.e., aligned with fishermen’s incentive.

### **Day 8**

### **Management, Facilitation and Communication Skills**



In today's world, it is impossible to be part of resource management and not attend meetings that address controversial issues. When dealing with diverse groups of people it is important to have the skills needed to minimize conflicts or deal constructively with the conflict. The ability to manage a meeting that enhances cooperation and achieves its objectives all in a timely manner is learned. Knowing how to plan, prepare, and conduct a meeting efficiently and effectively are skills learned to handle public issues. The goal of this session is to increase your ability to design, conduct and control meetings in public forums on topics that can be controversial in such a way to ensure a cooperative and participatory outcome.

### **Narragansett Indian Tribe Dinner (evening)**

We will attend a dinner with the local Narragansett Indian tribe. This relaxed interaction will consist of storytelling and local indigenous knowledge of fishing.

## **Day 9**

### **Designing Fisheries Management Plans in an EBFM world**

- ∞ **Setting Fisheries Management Objectives.** This session will educate attendees about the complex and often competing objectives of fisheries management. Biological, economic and social aspects which relate to conservation, structures, markets and relations with the outside world will be discussed. Not clearly defining objectives are often the reasons management actions fail. Attendees will share their viewpoint on the objectives used in their respective fisheries and learn to combine objectives to outcomes and management options.
- ∞ **Fisheries Management: Building the Components of a Management Plan.** This session will discuss the process needed to help create a workable fisheries management plan under an EAF scenario. The planning process serves to ensure that all available information is considered, that the main issues are given the necessary attention and the stakeholders have had the opportunity to contribute to the process and to understand the implications of what is being proposed. A management plan includes background information on the resource, a description of the fishery, problems of the fishery, management objectives, management measures and alternatives.
- ∞ **Adaptive Management:** Adaptive management differs from the conventional practice of fisheries management by emphasizing the importance of feedback from the fishery in shaping policy, followed by further systematic experimentation to shape



subsequent policy, and so on. It is iterative, repeating a process of steps to bring the manager and fisherman closer to a desired result. Each iteration should involve making progress in reaching established goals and objectives. The use of adaptive approaches allows for flexibility in dealing with changes environments and complex systems.

- ∞ **Mining the Management Case Studies: Where are we now? Where do we want to go? How do we get there?** Using the knowledge gained from the sessions on establishing management plans, participants will examine their situations (or general case studies) and redesign an improved future set of actions.

## Day 10

### Implementing Fisheries Management Plans

Now that the objectives are established, how will you reach them? What type of harvesting rule or other tool can you use to manage the fishery? What kind of data will you need to collect to monitor progress?

- ∞ **Management Toolbox: Traditional and Innovative** This session will focus on the study of traditional and community fisheries management measures in an effort to learn from activities that have survived the test of time. We will discuss traditional fishery management measures that have changed within specific social frameworks but may not be adaptable to other areas, as well as management plans that may be useful in illustrating fundamental principles. As traditional measures have dead ended in some cases, there are many new innovative approaches being successfully utilized. These include rights based approaches, community and individual quotas (such as catch shares and sectors), marine protected areas, and other tools. Case studies will be discussed.
- ∞ **Fisheries Data Collection and Analyses** This session will provide the participant with a comprehensive list of the wide variety of data required to conduct effective fisheries management. The data can basically be divided into fishery dependent and fishery independent data. The fishery independent data includes data on the length, weight and maturity at age so as to be able to characterize growth and maturity processes. Data on stomach contents allows for an understanding of food habits, and ecological relationships between marine resources of various trophic levels. Survey data on the abundance and distribution of fishery resources allows for the development of relative indices of abundance after a time series of sufficient duration has been developed. The relative indices of abundance also allow the estimation of mortality using catch curve analysis. Finally, survey data of fish abundance and distribution when combined with habitat or environmental information allows for the development of functional relationships



between fish distributions and habitat characteristics. Fishery dependent data complements fishery independent data, as it includes fishery based catch data on landings and discards from at sea observers or logbooks, and fishing effort data. From these data the total number of fish lost from the stock can be estimated. Catch per unit effort can be estimated, and this provides another relative index of abundance. Fishing mortality can be estimated, and using various models, total stock biomass can be estimated.

## Day 11

### Reducing Fishing Gear Impact (Bycatch and Habitat)

- ∞ **Basic Gear and Fishing Methods** This session will provide a description of all gears used to harvest fishery resources from the most rudimentary artisanal methods to the most sophisticated methods used in industrial fishing. The descriptive scheme will follow that developed by Von Brandt more than 40 years ago, and still used today. With each gear type described, the gear will be classified as to active or passive, mobile or fixed, relative efficiency will be discussed including recent improvement in efficiency, bycatch and habitat impact issues will also be discussed for each gear type. Most fishing gears can be used for both harvesting and for scientific sampling, but each application requires appropriate use of the gear.

Short field trip aboard a research vessel to demonstrate the use of a survey trawl, lunch provided) (2 hours)

A short field exercise will be included in this session where participants will go out aboard the URI Research Vessel Capt Bert to collect and analyze a typical survey trawl sample.

- ∞ **Reducing Bycatch and Habitat Alteration through Selective Gear Design** Bycatch is described as either non-target catch or catch that is discarded. Discarded catch is usually due to regulatory or economic considerations. Regulatory discarded included undersize fish of the target species, or protected, endangered, or threatened (PET) species. Unwanted species for which there is no market are also discarded. In the last two decades considerable progress has been made on reducing bycatch in many fisheries using both fish behavior and simple mechanical size sorting. In many cases the reduction of bycatch has resulted in a win-win situation for conservation and for fishermen. This session will provided specific examples of recent progress in bycatch reduction and habitat alteration in many fisheries, including these fisheries where additional research remains to be done. Some recent examples of very successful bycatch reduction programs include: dolphin in the tuna purse seine fishery, sea turtles in pound net and shrimp and scallop trawl fisheries, sea birds in longline fisheries, and undersize fish in gillnet, trap, and trawl fisheries.



## Day 12

### Governance: Challenges, Capacity Building

The basic challenge to governance in fisheries management is to establish and maintain institutions – norms and rules to guide decisions that include a formal framework for decision making. The process for establishing, enabling and maintaining institutions for improved governance is often not clear and requires a process of learning and adapting to the context of the country and fishery involved. The balance of responsibility that must be shared among governments, communities and industry has to be worked out through negotiation and an iterative process.

- ∞ **Decentralized management** - The development process from centralized, government-based, top-down fisheries management to decentralized, community-based, bottom-up fisheries management is not just a movement from A to B. It is a devolving process, with several layers and feedback loops. Activity planning is an output of this reiterative process. It is a dynamic, three-dimensional process and the needed timeframe as well as the financial support it requires largely depend on the situation in each country. Decentralized fisheries management has to be implemented at two levels, i.e. the policy level and the activity level. At the policy level the process needs political will to change the fisheries management setup. There was a discussion on whether political support, particularly financial support, was needed. It was felt that, once the communities act, the governments and bureaucrats show interest. At the activity level the process needs to maintain the cooperative spirit within the communities. Only through constant contact with the community could the needed motivation be established to move forward in managing small-scale fisheries.
- ∞ **Co-management** – or power sharing, must be a legitimate legal process. Cooperative management or co-management can be defined as a partnership of the community of local resource users (fishers), government, other stakeholders (boat owners, fish traders, boat builders, business people, etc.) and external agents (non-government organizations, academic and research institutions) that share the responsibility and authority for the management of the fishery. Through co-management, the partners actively contribute and work together on fisheries management and share the costs and benefits and the successes and failures. It is a participatory management process that provides and maintains a forum or structure for action on participation, rule making, conflict management, power sharing, social learning, dialogue and communication, among the partners
- ∞ **Enforcement and Compliance.** The various ways that compliance to management policy has worked or not will be explored using case studies and examples from other fields such as water quality and conservation. Application of the fishing code of conduct



will be discussed as well as the power of the market place to motivate compliance with best practices.

- ∞ **International agreements.** Increasingly, international trade agreements and treaties are influencing local fisheries. These trends and the power of current international agreements will be discussed.
- ∞ **Marine Conservation Agreements** include any formal or informal understanding in which one or more parties commit to delivering explicit economic incentives in exchange for one or more other parties committing to take certain actions, refrain from certain actions, or transfer certain rights and responsibilities to achieve agreed-upon ocean or coastal conservation goals.

## Day 13

### Capturing Local Knowledge

EBMF requires the involvement of ecosystem users and other stakeholders. This implies and includes a common knowledge base. Fishermen's knowledge of fish species, catches, ecology and habits can be very precise and helpful to fishery management. In order to match scientific knowledge with traditional knowledge, there are various tools and methods that can be used to collect this information and validate it.

### Collaborative Research

This session will cover a growing trend in fisheries research called collaborative research which works to increase the temporal and spatial scale of information, while linking the local knowledge and experiences of fishermen with scientists' research-based knowledge. This form of research is expected to improve policy-making by generating stakeholder trust and buy-in to science-based management. We will examine case studies from around the world to see how to apply these innovative tools.

## Day 14

**Choice of one day Intensive Study Program: Advanced Stock Assessment, Hand on Bycatch Reduction, Innovative management tools, Economics and Social Survey Design and Analysis; Other Topics? Can be optional at end of workshop?**

- a. *Basic Methods in Quantitative Fish Stock Assessment*



Based on the experience and needs of participants, this session can cover the development of YPR and SSBPR models, Equilibrium Surplus production Models, or Biomass Dynamic models using non-linear regression techniques with Solver implemented in EXCEL

b. *Bycatch Reduction in Fisheries*

Based on the experience and interest of participants, this session can include conducting size selection experiments at sea, and estimating size selection characteristics of trawls and gillnets in EXCEL, or reducing bycatch of sea turtles in shrimp trawls, including the installation of turtle excluder devices (TED) in a shrimp trawl, and the techniques required to evaluate the effect of the TED on shrimp catches.

c. Rights-based Approaches and *Catch Shares*

d. *Use of ECOPATH and ECOSIM.* Ecosystem-orientated thinking is increasingly incorporated into fishery management. Given the complexity of ecosystem processes, there is a need to have the tools needed to steer this thinking critically. ECOPATH with ECOSIM (EwE), an aggregate system-modeling package, is currently the most widely employed approach to assess the ecosystem effects of fishing. The basic equations and assumptions, strengths and weaknesses, and the potential of this approach to contribute to practical fisheries management advice will be reviewed.

d. *Other course descriptions?*

## Day 15

Presentation of Participant Action Plans

Graduation

