

**The Lessons Learned Workshop  
USGS/FWS  
Comprehensive Conservation Planning Pilot Projects  
January 22, 2003, Lakewood, CO**

Attendees

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**Background:**

The Comprehensive Conservation Plan (CCP) Demonstration Project brought together the natural resources management expertise of the FWS and the scientific skills of the USGS to develop several prototype CCPs with sound scientific foundations. The demonstration project was implemented at six refuges, three in Region 3 (Sherburne, Muscatatuck, and Crab Orchard) and three in Region 6 (Sand Lake, Arrowwood, and Arapaho).

The prototype CCP Demonstration Project was to include five main components:

- (1) Development of a process for establishing goals and objectives for the refuge;
- (2) Synthesis of available scientific information relevant to refuge objectives;
- 7 (3) Development of decision support tools that aid in establishment of objectives, alternatives  
 8 development, management actions, and monitoring efforts;

(4) Development of habitat and wildlife monitoring protocols amenable to both refuge and regional application and analysis; and

(5) Provide guidance on integrating human dimensions into refuge planning and objective-setting.

**1. Current status of the Refuge CCP:**

- Region 3: Sherburne, and Crab Orchard NWR draft CCPs are being revised by refuge staff and should be available for internal review by Spring 03; Emphasis/priority for Muscatatuck seems to have been postponed for awhile so USGS has not been directly involved except that UMESC mentored a University of Minnesota student that developed a vegetation map of refuge using the NVCS .
- Region 6: Sand Lake and Arrowwood – alternatives are currently being developed; Arapaho – draft should be finalized this year

**2. What has been accomplished by topical area:**

**Goals and Objectives:**

**David H, Murray L, Rick S FORT**

- Goal & Objective Handbook - worked closely with Liz Bellantoni and Bob Adamcik, of FWS Refuge Headquarters in Arlington, VA, in developing the technical and biological content of this National policy guidance handbook for the FWS.
- National CCP Course – responsible for revising the biological portions of G&O, and teaching this section of the course. Moving to hand this off to FWS.
- Preplanning handbook – we have a primary role in developing preplanning guidance for the Comprehensive Conservation Planning efforts of the Fish & Wildlife Service, and have completed a first draft of all of the biological and habitat components.
- Regional Goal and Objective Workshops for FWS - developed materials and presented four workshops (in FWS Regions 1, 3, 4, and 6) on the subject of developing high quality goals and objectives for CCPs.
- Conducted a series of biological workshops for Arapaho, Arrowwood, and Sand Lake Refuges (Tom Larson, please add refuges in Region 3 if biological workshops were held). These workshops were important precursors to the discussion and development of refuge goals and objectives.
- CCP technical reviews - provided detailed technical reviews of 15 CCPs, focusing primarily on the biological aspects and goals and objectives.
- National Habitat Management Planning course for FWS. Continue to work closely with the National FWS Team charged with developing this remote learning course. Have responsibility for developing 2 of the 6 lessons, specifically related to goals and objectives, and habitat management strategies.
- Presented a paper titled “Comprehensive Conservation Planning and Ecosystem Restoration on National Wildlife Refuges” at the joint meeting of The Ecological Society of America and the Society for Ecological Restoration, in August, 2002. This will be

submitted to the journal "Restoration Ecology".

**Synthesis of Scientific Information:**

**David H, Rick S, Murray L, FORT/NPWRC**

- Literature on grassland restoration techniques, germination requirements of various native and invasive grasses, and potential seed mixes that might be used for restoration and enhancement efforts. These products were provided to refuge staff at the workshop. Subsequent workshop discussions developed habitat-based grassland goals and objectives.
- Wildlife List; Species/Habitat Relationship Database. A list of wildlife species for the grassland workshop included 44 birds, two butterflies, and four mammals. For the birds, a series of four charts were developed (visual obstruction readings, minimum nesting area, vegetation height, distance from water) to illustrate the range of habitat conditions at the nest sites. By clustering these conditions across all bird species, seven categories of grasslands were identified that would provide the habitat requirements for the species of interest (as well as many other grassland birds).
- Conducted a series of GIS analyses prior to the grassland workshop that helped identify structural conditions such as:
  - Areas within 100m of water that would be used by nesting waterfowl.
  - Minimum patch sizes and perimeter: area ratios of existing grassland patches.
  - Management scenarios involving converting cropland and woodland to grassland.

**Decision Support Systems:**

**Carl K, Kevin K, CERC/UMESC**

- Compiled relevant GIS data layers for each of the pilot refuges into individual ArcView projects for each pilot refuge. Data includes FWS point data, infrastructure, hydrology, political/administrative boundaries, FWS management plans, vegetation coverages, soils data, National Wetland Inventory classifications, digital rectified images, aerial photography, and miscellaneous geographical data
  - Total number of data layers by refuge is Arrowwood (21), Arapaho (48), Sherburne (97), Sandlake (22), Crab Orchard (67), and Muscatatuck (37).
  - Arapaho, Arrowwood, and Sand Lake NWR ArcView project CDs distributed to FWS Region 6, refuge, USGS FORT, and BEST staff.
  - ArcView project and GIS datasets of Crab Orchard and Sherburne NWR provided to FWS Region 3, Sherburne NWR, and FORT and BEST staff.
  - Crab Orchard NWR ArcView project provided to FWS Region 3 and refuge staff.
- Completed a vegetation mapping project for the Crab Orchard National Wildlife Refuge for use during the developmental stages of a CCP for the Refuge.
  - Color infrared aerial photographs (1:15,000-scale) were acquired by the FWS.

- UMESC personnel conducted a field reconnaissance effort at the Refuge with refuge biologists and the forester to ground-truth and develop a relevant classification system and the scale that they desired. Completed the photo interpretation and mapping during winter/spring 2001.
- UMESC personnel created a color infrared photo mosaic of Crab Orchard Refuge which was rectified for use in ArcView
- A Land Cover and Land Use digital spatial database was developed using the National Vegetation Classification System (NVCS) at the Formation level (Alliance level when necessary and possible). A map project report accompanied the spatial database documenting the mapping process and classification (Crab Orchard National Wildlife Refuge Land Cover and Land Use Spatial Database [2000] Project Report - December 2001).
- Developed and provided a spatial decision support system (i.e., CCP query, edit, clipping, compositional tools) to regional refuge planners, refuge staffs, and the USGS-CCP Project Team to facilitate the CCP process.
  - CCP Query tool couples species-habitat information to spatial data in a decision support system format.
  - Designed and populated a matrix of habitat/species for each refuge based upon refuge and regional office input.
  - CCP Edit tool allows planners and managers to interactively make polygon specific changes to a refuge base coverage to depict future landscapes under various management scenarios. This was especially effective for the CCP process on Crab Orchard and Sherburne NWRs.
  - CCP Clipping tool allows user to clip data themes and produces summary statistics such as change in composition of the clipped region among data themes.
  - CCP Compositional tool allows user to compare the spatial composition of the refuge to the surrounding landscape
- Provided ArcView software to Dan Petit and staff at Arrowwood NWR.
- Provided ArcView training to staff from Sand Lake NWR & WMD and Crab Orchard NWR.
- Provided technical assistance related to the use of ArcView to regional and refuge staff.
- Met with refuge and regional biologists on several occasions to develop species-habitat matrices for use with DSS tools.
- Participated in numerous refuge CCP workshops at Crab Orchard and Sherburne NWRs. Attended “kickoff” meetings for the Arapaho, Sand Lake, and Arrowwood CCPs.
- Scanned 1968 Soil Survey maps, rectified and developed digital spatial database, provided to Sherburne NWR staff.

- Future landscapes based on open land- and forest-emphasis management scenarios developed and provided to FWS Region 3 planning and Crab Orchard NWR staff.
- Comparisons of historic soil types and National Wetland Inventory data to current wetland coverage provided to FWS Region 3 planning and Sherburne NWR staff.
- Communicating Science
  - Publication: Korschgen, C. E., M. G. Knutson, T. J. Fox, L. E. Holland-Bartels, H. C. DeHaan, C. H. Theiling, J. J. Rohweder, K. P. Kenow, L. E. Leake, and T. Will. *In Press*. Natural resource assessment and decision support tools for bird conservation planning. Proceedings of the Third International Partners in Flight Conference: A workshop on bird conservation and implementation (C. J. Ralph, Ed.). Partners in Flight and the U.S. Forest Service, Asilomar, California, USA.
  - Publication: Fox, T. J., J. J. Rohweder, K. P. Kenow, C. E. Korschgen, and H. C. DeHaan. *In Review*. GIS tools for National Wildlife Refuge Comprehensive Conservation Planning: User's Manual. Prepared for submission as USGS publication GIS Tools for National Wildlife Refuge Comprehensive Conservation. Intended to be published as a USGS IT Report.
  - Provided our customized ArcView CCP tools and data to the GIS specialist at NCTC for use in GIS and CCP courses.
  - Web page at UMESC web site: GIS Tools for National Wildlife Refuge Comprehensive Conservation Planning (with link to draft CCP GIS Tools and user's manual)
  - Reviewed portions of CCP documents – Mike Brown's landscape analysis of Crab Orchard NWR that was conducted using the CCP GIS tools.

### Monitoring:

#### Marshall H, Sam D, PWRC

- Reviewed current databases and monitoring activities at Sherburne National Wildlife Refuge.
- Develop Percent Area Occupied (PAO) approaches to monitoring animals. PAO estimators provide unbiased estimates (unlike traditional indexing techniques) of the number of sites that are occupied by an animal. Managers and biologists can collect PAO data using traditional techniques. By making multiple site visits the probability of detection can be estimated for a species. This is a simpler and more viable alternative to

actual population monitoring for meeting many refuge objectives. Resolution is needed as to the efficacy of the PAO estimator as a tool for meeting monitoring needs. For some it is difficult to make the connection between PAO approaches (population monitoring) and habitat-based objectives when those objectives haven't been developed or reviewed. >??

Yes- Need a good habitat based monitoring person in USGS (if available) to help.

- Developing a web-based monitoring manual intended to be a resource that is highly user-friendly and walks the user through some steps to help them define their monitoring needs and eventually lead them to the appropriate methods. The land/wildlife manager will be the primary target, so it should be useful throughout the refuge system as well as in most other land management frameworks. It will provide both conceptual guidance and some very specific guidance for different situations, and it will be usable by both relatively naïve and more sophisticated users. Need to address concern that some field biologists in FWS may not have the capability to use this manual (workshops, training course at NCTC?). Bird and amphibian monitoring guidance will be developed first, followed by other priority taxa as time and funding permit. Region 6 recommends not investing resources in the development of bird or amphibian guidance until the web-based monitoring manual has been tested and its utility proven. How does this tool apply to habitat-based objectives? The test site for the manual is:

<http://testweb-pwrc.er.usgs.gov/monmanual/>

## 2 Human Dimensions:

### Lee L, Lynn C, Dave F, FORT/MN Coop Unit

- Have identified and are conducting the social science research needed for:
  - providing the refuge's informational needs
  - complementing the biological analysis
  - contributing to a more defensible science based CCP
- An economic analysis contributes two critical pieces of information to the CCP process:
  - 1) illustrates a refuge's true value to the local community
  - 2) determines whether local economic effects are or are not a real concern in choosing among management alternatives
- Visitor surveys are being conducted to collect information on:
  - importance of different visitor activities
  - opinions and preferences about refuge management
  - types of experiences
  - importance vs. satisfaction with refuge conditions
  - activities and spending on most recent trip
    - ◆ provides current visitor spending for economic impact analysis
  - Biological understanding

The visitor survey includes:

Standard questions

- Baseline information
- Comparisons across refuges

Refuge specific questions -> Cannot use a generic survey

- Informational needs
- Possible management changes

- Difficulties

- Survey:

- 1) Takes up to a year because of seasonal visitors
- 2) Informational needs typically not known that far in advance
- 3) Need at least six months for OMB approval
- 4) Handout procedures are problematic
- 5) Have high financial and personnel costs - need to take burden off refuge staff

- Economic analysis:

- 1) Need well defined management alternatives

- Accomplishments

- Arapaho NWR:

- 1) Attended biological workshops, public scoping meetings in Walden and Fort Collins, and refuge meetings on grazing and public use
- 2) Completed the baseline regional economic analysis for the no action (current management) alternative
- 3) Provided grazing reduction scenarios to the refuge staff

- Arrowwood NWR & Sand Lake NWR:

- 1) Attended biological workshops
- 2) Worked with staff to develop survey
- 3) Visitor surveys in progress

- Presentation - USGS Social Science Research Related to CCP Public Use Planning. Presented at National Wildlife Refuge System National Planning Retreat, Snow Mountain Ranch, Winter Park, CO. August 20-22, 2002.

### **3. Lessons Learned**

The time required for development of CCP products was underestimated by FWS. None of the CCPs have advanced to the point the USGS staff could provide "science" reviews or complete some of their tasks by the end of FY02.

- Overview
  - The CCP process benefited from all of the USGS participants. They brought a level of experience and expertise to the process that will inform management into the future. The quality of the product will directly reflect the quality of their participation.
  - ✓ ○ Communication: Significant issues were raised regarding the need to enhance communication among USGS-CCP team members and among USGS/FWS CCP contacts. USGS and FWS need to be clear and precise about what is to be accomplished.
  - ✓ ○ One size doesn't fit all – The support needs among refuges vary based on their capabilities, interests and needs for goals and objectives development; data; monitoring needs and capabilities; social and economic analysis, GIS and decision support.
  - Development of CCPs takes longer than expected. For example, the development of goals and objectives requires four to five 3-day workshops held over a period of 4-5 months in order to achieve results. Refuge schedules limit significant participation, often to the winter months. USGS recognizes that teams are often dependent upon the delivery of products/results from other team efforts. Not all efforts can function simultaneously.
  - The pilot projects occurred during a period when the Service was still assembling Planning staffs and developing guidelines for the CCP process. Service experience with the CCP process was limited at the start of the pilot projects. Therefore, the specific roles of the USGS staff, how the technical workshops fit in the broader planning process, and the expectations of Service staff were not always well planned, coordinated or understood. Based upon experience since and during the pilot projects, this would not be the case in the future.
  - CCPs frequently demonstrate the need to shift from a population to a habitat management approach. This is challenging for many refuge managers, yet the “ground-up” approach taken in the demonstration projects may be the best way to persuade managers of the need for change.
- Goals and Objectives
  - CCP course – have received very high marks on the G&O sessions.
  - G&O Handbook – favorably received, being used in training course. Yet to be signed off on by FWS, but is close.
  - CCP technical reviews – FWS actively seeks comments from USGS, and benefits from outside review.
  - Objectives and SMART criteria – there are still many objectives that do not meet the SMART criteria in draft CCPs. Discrepancies exist in the expectations imparted by the regions to the refuges as to the level of specificity their goals and objectives must achieve. This discrepancy presents a variety of challenges to G&O developers and CCP reviewers.
  - With time and experience the G&O process is becoming more streamlined and is

improving.

- Synthesis of Scientific Information
  - Use of available science. Not all plans appear to make use of what is known. Some argue they have a hard time obtaining the information.
- Monitoring
  - Early inventory of existing monitoring activities at each of the refuges would be beneficial and would benefit from a critical review of existing protocols. The inventory will also help to focus refuge staff on monitoring issues.
  - Specificity is emerging as an issue re: monitoring. At present a monitoring plan is not required as part of the CCP.
  - The treatment of monitoring information varies among refuges. No mechanism exists within the refuges USGS is working with to analyze and archive the monitoring data.
  - The monitoring web-based manual includes topics on analytic tools but these may prove to be beyond the technical capabilities of refuge personnel. This will need to be an element of the field-testing of the web-manual.
  - Concern that monitoring is concentrating on populations and not including habitat monitoring.
  - Development of a monitoring strategy within CCP is the least developed due primarily to the lack of G&O being finalized.
- Human Dimensions
  - OMB approval of surveys required to assess visitor use and preference may take as long as 1 year. This presents significant challenges when attempting to incorporate findings within the CCP.
  - Identified need to incorporate monitoring of the “human dimension” within the context of long-term monitoring efforts.
  - Integration of the human dimension with biophysical aspects of CCP needs to be encouraged. Incorporation of economic impact of management alternatives seems to provide good opportunity to move in this direction. Incorporation of the human dimension within a broad suite of FWS CCPs is difficult given the lack of social science expertise in FWS and USGS.
- Decision Support Systems
  - Many Refuges are data poor, especially lacking in good land cover layer data.
  - Numerous inadequacies and inconsistencies exist in vegetation maps among the Refuges. Efforts to broaden USGS assistance in vegetation mapping / consultation to ensure compliance with National Vegetation Classification Standard (e.g., thematic resolution, scale) should be emphasized.
  - Concern that vegetation mapping through USGS may be cost prohibitive. The cost of the CRO project was in line with the costs of LaCreek and another Region 6 refuge – plus CRO received a great report, and photo-mosaic, and an accurate GIS LCU layer. Based on the Muskatatuck NWR experience USGS has better QA for development of spatial layers from a geographic point of view.
  - Use and application of DSS may be limited by the lack of understanding and ability to

utilize the system on the part of refuge staff that is not keeping up with current technologies. More effort needed to identify metrics of greatest value; develop user manual (Final Draft completed); engage refuges in providing input and development; and work to ensure the tools provided address their needs.

#### 4. Options for the Future

- **Refuge Specific Assistance:**

- ✓ ○ Continue to develop and support Species-Habitat database and work to web-enable.
- Incorporate habitat-based monitoring approach within web-based monitoring manual, and work with individual refuge staff to use and implement based on identified need.
- ✓ ○ Conduct hydrologic assessment of refuges and associated watersheds if there are water quality or other hydrological issues.
- Continue development of decision support system started for the Green and Yampa Rivers that stores USGS gauging station data, related water quality information, and available fish data, allowing a user to easily generate summaries and analyses in table and chart form (e.g., comparison of flows pre- and post-dam construction, comparison among gauging stations, etc.). To make this useful for CCPs, enhancements that would be needed include:
  - 1) adding some additional tables and charts (e.g., flow-duration curves, exceedence curves),
  - ✓ 2) loading data from the Souris River and test the utility in our upcoming Souris Loop refuges workshops for FWS Region 6,
  - 3) converting to a web application and make it easy for users to load pertinent hydrology, water quality, and fish information from the appropriate USGS (and other agency) web sites.
- Expand GIS based land cover in compliance with National Vegetation Classification Standards for refuges, especially in Regions 3 and 6.
- Evaluate the need and value of existing refuge monitoring efforts (biological, hydrologic, public use, and management) and their potential contribution/priority relative to CCP.
- ✓ ○ Work to develop scientifically valid, cost effective, monitoring plans needed to implement and evaluate CCP goals and objectives.
- Encourage refuges to take advantage of experts outside of FWS i.e., USGS to assist in CCP development and implementation.
- Increase the use of available scientific knowledge – use NCTC and other library services, acquire and read major pertinent literature, stations subscribe to journals, synthesize literature and make available via Internet. Ongoing training in areas of wildlife habitat.
- ✓ ○ Expand level of support to other Refuges in Regions 3 and 6 (e.g., Red Rock Lakes, LaCreek, Kirwin Refuges in Region 6).

- ✓ ○ Continue to provide resources for pre-CCP site-specific visits to discuss resource management issues and biological potential in Regions 6 and 3, and help with developing the Regional Biological Potential Strategic Initiative.
- Significant issues pertaining to FWS CCP guidelines. Need greater clarification on:
  - 1) The principal audience (management, public, funding, NEPA)? It should be assumed that CCPs would need to address multiple audiences and satisfy multiple needs.
  - 2) Should objectives be habitat or wildlife based? A proven vehicle is the species/habitat database developed for Region 6. Again, a direct link should be made between the habitat and individual species. The DSS system seems to provide a reasonable vehicle to do this.
  - 3) How should NEPA compliance be incorporated into CCP? The key issue embedded in this question is options. Again, DSS should be able to provide an analysis of tradeoffs when various habitat options are considered.

#### **National/Regional in scope:**

- Work with FWS Regions 3 & 6 to enable the identification measure, and assessment of biological habitat potential including: (a) goals and objectives (b) the role of each refuge within the region (or subset of refuges) in achieving the goals and objectives; (c) establishment of a monitoring plan to measure, evaluate and assess the biological habitat potential of the region and provide monitoring information necessary to manage at the scale of the refuge and assess at the scale of the habitat; (d) incorporate the human dimension in measures of the biological habitat potential; (e) develop and evaluate various tools, models, decision support systems, etc. that may assist the region in achieving a-d. Periodically, not less than once each year, a meeting among regions 3 & 6 will be held to share approaches, lessons learned, and explore opportunities for collaboration and linkage.
- Work with FWS HQ to identify 1-2 refuges in 1-2 other FWS regions to initiate a new FWS-USGS CCP Demonstration Project. The USGS will identify other individuals with similar expertise as has been employed in this demonstration project to participate in the new starts. The inclusion of new USGS scientists and a different skills mix should make the CCP demonstration projects more robust and relevant to addressing FWS needs.
  - Recommend a small work-group be formed among interested parties to define a scope of work and formalize a MOA.
- Finish and deliver pilot projects initially agreed upon, including review and comment on draft and final CCPs. Evaluate their relevancy and utility to FWS, and establish agreement among FWS Headquarters, Regions, and USGS on what are the highest priority CCP needs requiring USGS expertise.
- ✓ • Species modeling and gathering GIS data for ecosystem scale assessments of areas of importance for Regional or Service priority species; this will allow us to relate a specific

refuge being planned to priorities in a larger context; this would also relate to the Wildlife Habitat Goals Promises Team's work.

- GIS based mapping of ranges for Regional or Service priority species.
- Human dimensions work; e.g. work being done in Regions 3 and 6 related to assessing the refuge visitor at specific stations undergoing CCP planning; e.g. develop a bank of OMB approved survey questions so that a refuge could select appropriate questions for their specific refuge and get OMB approval in a much shorter time than an OMB approved survey would normally take.
- Processing Patuxent breeding bird survey data to produce GIS-based range maps.
- Compilation of GIS based data that would complement the LAPS system, address Refuge System strategic growth questions, and in the process provides valuable data to CCP planning (e.g. data base of free flowing rivers, US watershed hot spots with 10 or more at-risk freshwater fish and mussel species, unique and threatened ecosystems, etc.).
- Expand the Internet-based Expert System data base being developed by Region 6 and USGS (Murray Laubhan at Northern Prairie) that would serve as a resource for daily refuge management as well as for CCP development; then system would provide detailed biological information for priority Service species, including detailed habitat preference information, range maps, etc.
- Land Management Research Demonstration Areas (LMRD Areas); identified in the Promises Doc.; in Region 3 these are Neil Smith NWR and Fergus Falls WMD; assist with research and projects that would make these good LMRD areas.
- Expansion of the UMESC's decision support system and species/habitat table (relates a wide array of species to specific habitats for various portions of their life cycle) for analysis of management and future land cover scenarios based using GIS based biological, land cover types, and other information.
- Assist FWS to implement National Vegetation Mapping System on refuge lands.