

A Structured Decision Process for Revising the US Fish and Wildlife Service Policy on Double-crested Cormorant Management

*A Case Study from the Structured Decision Making Workshop
January 24-28, 2011*

National Conservation Training Center, Shepherdstown, West Virginia, USA

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Decision Problem

The decision addressed at this workshop was how to modify national policy that provides for effective management of Double-crested Cormorant (DCCO) populations within the United States (US). Primary management objectives surrounding DCCOs are at times in conflict. They include meeting conservation obligations under the Migratory Bird Treaty Act (MBTA) and other federal laws, while addressing human-wildlife conflicts related to the recent expansion of DCCO populations, particularly in the Great Lakes and southeastern US. Two previous workshops on this subject have focused on development of a prototype decision-framework at local management scales and have largely ignored the higher-level but related (linked) decisions that provide the basis for local-scale decision making. In this workshop, we developed a framework to characterize decisions at the national scale, with explicit consideration of the process by which such decisions are linked hierarchically to those made at USFWS regional, Flyway, State, tribal, and local levels. Under the current regulations, control activities are proposed and conducted annually at the local level by individuals or agencies operating under depredation permits, the Aquaculture Depredation Order (AQDO), or the Public Resource Depredation Order (PRDO). USFWS Regional Directors make annual decisions on whether to allow these activities. Ultimately, the USFWS Director will decide, through the National Environmental Policy Act (NEPA) process, on a national management strategy by 30 June 2014, at which time the existing depredation orders will expire.

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Background

Ecological context

Double-crested Cormorant populations, particularly those breeding in the Great Lakes states and provinces and those wintering in the southeastern US, have increased rapidly since the mid-1970s. Before that time, DCCOs were considered a rare breeder in the Great Lakes, with the first confirmed nesting documented in 1913 (Wires and Cuthbert 2006). The reasons for this rapid expansion are unknown, but alterations of the Great Lakes fish communities from the invasion of exotic species, in combination with the expansion of aquaculture and the construction of reservoirs in the southeast US, is one hypothesis. US Federal protection of migratory birds under the MBTA in 1972, through an amendment to the Convention with Mexico, and the elimination of DDT also likely played a part in the more recent population increases. By the mid 1990's, DCCO populations were perceived to have a negative impact on the aquaculture industry and natural resources at many locations across North America. Cormorants have been implicated in several human conflict issues including depredation of aquaculture stocks and local sport and commercial fisheries, as well as conflicts with other conservation interests such as damage to sensitive vegetation and other colonial nesting bird species (Fielder 2010, Glahn and Brugger 1995, Herbert et al. 2005, Rudstam et al. 2004, Somers et al. 2007). In certain areas, evidence suggests that cormorants have contributed to declines in walleye, yellow perch, and smallmouth bass, whereas in other areas no such evidence exists for the decline of sport fishery stocks (Seefelt and Gillingham 2006). The implication of cormorants as a causative factor in these declines is confounded, however, by uncertainties regarding the effect of other ecosystem changes (e.g., exotic species introductions, lower nutrient loading, or decreases in alternate prey) and how these changes interact with each other and with cormorant population dynamics.

Legal, regulatory and management context

The USFWS has statutory authority to manage migratory bird populations in the US, under the MBTA (16 U.S.C. 703–712) and the Conventions with Canada (1916 as amended in 1996), Mexico (1936 as amended in 1972), Japan (1972), and Russia (1976). USFWS has interstate regulatory authority over cormorants and permits reduction options to individuals and agencies. All the Conventions, except that with Mexico, specifically permit the lethal take of birds and eggs to protect injury to agricultural interests, persons, or property. Federal regulations (50 CFR 21.1) in turn establish depredation orders, which provide limited exceptions to protections afforded by the MBTA. USDA Wildlife Services (WS) has statutory authority to protect American agriculture and other resources from wildlife damage, under the Animal Damage Control Act of 1931. WS also has responsibility under the AQDO for certifying aquaculture producers to act under the order. In Canada, DCCOs are not federally protected since they are not listed in the 1916 Convention with Canada, or the 1996 amendment. Thus, cormorant management policy in Canada is developed and implemented at the provincial level.

In response to rapidly increasing wintering populations in the southeastern US, breeding populations of DCCOs in the Great Lakes region, and concerns about potential impacts, the USFWS adopted two depredation orders that facilitate the control of depredating

DCCOs. The Aquaculture Depredation Order (AQDO) was established in 1998 to assist with the control of DCCOs at aquaculture facilities in 13 States. In 2003, the AQDO was modified and a Public Resource Depredation Order (PRDO) was established to protect additional public resources including fish, wildlife, plants, and their habitats from DCCO impacts in 24 States (USFWS 2003). Both depredation orders were recently authorized to remain in effect through June 2014 (USFWS 2009a and USFWS 2009b). Prior to establishment of the depredation orders, depredation permits were the primary tool used to resolve DCCO conflicts, and are still used to resolve conflicts related to human health and safety and economic losses to private property in all states, including those operating under the depredation orders.

Double-crested Cormorants in the U.S. are managed aggressively at selected sites on the breeding and wintering grounds and during migration to alleviate damage and lessen economic, social and ecological conflicts. Management actions are conducted locally each year and include various forms of harassment, shooting, nest and egg destruction, and egg oiling. Under the PRDO, action agencies (State fish and wildlife agencies, federally recognized Tribes [acting on tribal lands], and USDA WS) submit written proposals to the USFWS Regional Migratory Bird Permit Office describing the location and level of the proposed management action. The Regional Director may prevent any activities that pose a threat to the long-term sustainability of DCCOs or any other migratory bird species. Often, decisions are made through interactive communications between the action agencies and USFWS. In some cases, USFWS asks the action agency to clarify their request or provide additional rationale for a decision. Inter-agency coordination also occurs through the NEPA process when environmental assessments are developed for cormorant management within individual states. No such interaction occurs under the AQDO. However, aquaculture producers may only operate under the AQDO in conjunction with an established nonlethal harassment program as certified by USDA WS as outlined in WS Directive 2.330. This certification is documented on Form 37, which WS is required to share with the USFWS when requested. Aquaculture producers submit an annual report of take by location and date as does USDA WS for take at roosts in the vicinity of aquaculture facilities. USFWS retains authority to revoke privileges to implement the PRDO or AQDO if they believe the depredation orders have not been adhered to, or if the long-term sustainability of DCCO populations is threatened.

There is a need to develop a strategy that will address the conflicts (real and perceived) of cormorants in a socially acceptable manner. With the expiration deadline for the current regulations approaching, we suggest using a structured approach for selecting appropriate alternatives in developing a national policy that takes into account DCCO management at multiple scales when revising the 2003 EIS and associated regulations. DCCO depredation and management is a priority issue for the USFWS and many other agencies that expend significant resources on management decisions. We propose that a SDM process will help clarify and consolidate objectives, develop and evaluate new and existing alternatives, reduce uncertainty, and, in the long run, provide savings in efficiency by coordinating future management efforts among multiple resource agencies. We believe that by identifying the fundamental objectives with regard to DCCO conflicts, we can better direct research and monitoring to reduce key areas of uncertainty

and focus management efforts on the set of decisions that will best address stated objectives.

Decision Structure

Scale and Decision Maker

Developing a comprehensive decision structure requires consideration of the decision process at each of the spatial scales relevant to DCCO management. The geographic scope of this problem incorporates decisions made at local management scales (including individual lakes, breeding colonies, aquaculture facilities, and roosts), at the State level, regional and national scales, and across international borders. Management objectives, decision alternatives, and models to predict consequences to the state of resources are different at each of the nested geographic scales. Identifying the specific components of the decision structure at each, and the decision maker(s) corresponding to that scale, was a non-trivial task and one that guided the analytic process through this and the previous two workshops. A matrix listing the relevant decisions being made at each scale and the by various decision makers helped focus the discussion for this workshop (Table 1).

Previous workshops focused on local scale decisions

(http://training.fws.gov/CSP/Resources/Decision_Analysis/aug_09/index.html). The purpose of this workshop was to focus on national scale decisions made by the USFWS in preparation for revising the 2003 EIS and associated regulations. It became apparent that a crucial component in structuring this decision-process is to identify the links between spatial management scales and to integrate decision making at each of these scales.

Objectives

Three fundamental objectives were identified at the national scale during this workshop:

- 1) Meet obligations the MBTA, Endangered Species Act (ESA), and other legal obligations (Figure 1).
- 2) Minimize conflicts related to DCCO impacts and management actions taken (Figure 2).
- 3) Minimize the costs of implementing regulations (Figure 3).

Workshop participants identified potential the means for achieving each of those objectives:

Fundamental Objective 1

- a. Maintain sustainable DCCO populations
- b. Minimize impacts to other migratory birds and Federally listed species

Fundamental Objective 2

- c. Maximize the ability to manage DCCO conflicts
- d. Maximize social acceptance of DCCO management actions

Fundamental Objective 3

- e. Minimize the cost of implementation by action agencies
- f. Minimize the cost of FWS oversight

These objectives represent a mixture of both biological aspects and human dimensions as important considerations in DCCO management. Expertise in both of these disciplines was represented among the workshop participants.

Measurable Attributes

We developed preliminary attributes with which to measure progress towards objectives for each of the means objectives as follows:

Objective: Maintain sustainable Double-crested Cormorant populations

Attribute: Determine population viability for five geographic areas:

- i. Interior US and Canada (*P. a. auritus*)
- ii. Northwest Atlantic (*P. a. auritus*)
- iii. Southern US (*P. a. floridanus*)
- iv. Pacific Coast (*P. a. albociliatus*)
- v. Alaska (*P. a. cincinatus*)

Measure: Quantitative viability assessment with binary threshold (sustainable/unsustainable)

Objective: Minimize impacts to other migratory birds and listed species

Attribute: Take of migratory bird risk

Measure:

- 1 = No impact, no take
- 2 = Very unlikely
- 3 = Possible
- 4 = Likely
- 5 = Highly likely

Attribute: Take of listed species risk

Measure:

- 1 = No effect
- 2 = Not likely to adversely affect
- 3 = May affect

Objective: Maximize the ability to manage Double-crested Cormorant conflicts

Attribute: Ability to address threats to human health and safety

Measure: 3 to -3 scale

- 3 = Strongly agree
- 2 = Agree
- 1 = Somewhat agree
- 0 = Neither agree or disagree
- 1 = Somewhat disagree
- 2 = Disagree
- 3 = Strongly disagree

Attribute: Ability to address economic losses to:

- i. Aquaculture
- ii. Commercial fisheries
- iii. Sport fishing

- iv. Non-fishing recreational activities
- Measure: 3 to -3 scale (same as above)
- Attribute: Ability to address impacts to public resources
- i. Fish
 - ii. Plants
 - iii. Wildlife
 - iv. Habitat
- Measure: 3 to -3 scale (same as above)

Objective: Maximize social acceptance of Double-crested Cormorant management

Attribute: Application of humane procedures

Measure: 3 to -3 scale

Attribute: Addresses non-consumptive values

Measure: 3 to -3 scale

Attribute: Results of management interference

Measure: 3 to -3 scale

Objective: Minimize the cost of implementation by action agencies

Attribute: Cost

i. Management

ii. Safety

iii. Administrative

Measure: \$

Objective: Minimize the administrative cost of FWS oversight.

Attribute: Cost

Measure: \$

Alternative Actions

Several alternative management actions were considered in the 2003 EIS (No Action, Non-lethal Management, Increased Local Damage Control, Public Resource Depredation Order, Regional Population Reduction, Regulated Hunting), with the selected alternative being a modification of the AQDO the establishment of the PRDO. Future possible management alternatives that may be included and addressed in the new NEPA document include: renewing the depredation orders as currently written (with or without an expiration date), modifying the current depredation orders, allowing the depredation orders to expire, or adopting a different alternative that may or may not have been considered in the 2003 EIS. The consequences of each of these alternatives must be evaluated well before the depredation orders expire.

For this workshop, we selected five examples representing a range of alternatives. The first action evaluated was Status Quo, referring to the situation as it exists now under the current system of permits, AQDO, and PRDO. The second alternative was an improved version of the current depredation orders, which would clarify some of the ambiguities in the current regulations, and modify some of the conditions based on the experience of implementation over the past several years. We also selected a liberal and conservative

version of the modified depredation orders to provide a range of alternatives. Finally, we included a Regional Population Regulation alternative as this management alternative (previously referred to as Regional Population Reduction) continues to be of interest to USDA WS and some State fish and wildlife agencies; after having been considered and rejected in the 2003 EIS.

We outlined specific details for each of the five example alternatives in order to better evaluate the predicted consequences of their implementation on the three fundamental objectives identified previously. We were able to do so for the four alternatives involving variations on the current depredation orders (Tables 2 and 3). However, there was a great deal of uncertainty surrounding the details of a Regional Population Regulation alternative (Table 4), that will need to be resolved before it can be fully evaluated.

Predictive Models

We envision evaluating the final suite of alternatives in a consequences table. For purposes of this workshop, we develop a consequences table for the five example alternatives based on measurable attributes of the means objectives (Table 5). Each cell within this table represents the result from a predictive model that has yet to be developed.

During the workshop, we evaluated each of the alternatives as a group using a constructed scale from 1-10 for all objectives except the “Viable DCCO breeding population in five zones”, which was either yes or no. In some instances, a range of values was used, reflecting the uncertainty in evaluating how an alternative would meet a particular objective.

In reality, predictive models must be developed to evaluate these alternatives. We identified those needed to include: 1) population models to evaluate the sustainability of DCCO populations; 2) a panel of experts to evaluate risk associated with the MBTA and ESA; 3) a survey of action entities to evaluate the ability to address conflicts, 4) a national public survey tool to evaluate social acceptance of various management alternatives, 5) budget analysis by action agencies, and 6) budget analysis by FWS.

Decision Analysis

Evaluating Trade-offs

Evaluating the best performing alternative requires the use of decision tools for multiple-objective problems, in order to account for competing objectives and attributes measured on different scales. We used the *simple multi-attribute ranking technique* (SMART) for comparing predicted consequences across objectives on a universal scale to optimize the highest ranking alternative and conduct sensitivity analyses (Clemen 1996). We applied swing weighting, a ratio-based technique used to quantify the relative importance of each objective to a decision maker, to determine weights for the set of means objectives. Objective weights were elicited from several workshop participants to represent a wide range of stakeholder values with which to explore the influence of differing values

systems on the trade-off evaluation (i.e., an optimization sensitivity analysis). We selected participants representing national, USFWS Regional, and local perspectives to conduct the swing weighting. A decision maker's weights (values) are then used to develop a weighted sum model for the multi-objective trade-off analysis, whereby the predicted performance of an alternative is evaluated in terms of an objective and then weighted by the relative importance of that objective. The weighted values for that alternative are summed across all objectives to determine a composite weighted score for the alternative, which is then compared to all other alternatives (Clemen 1996) to determine the highest-valued alternative. Thus, objectives measured on different scales and with different relative importance to the decision maker can be traded off under each alternative to produce normalized performance scores to select the optimal decision. Sensitivity analyses can be used to evaluate the impacts of different weights (human values) and predicted consequences (model uncertainty) on identifying optimal decisions.

Several interesting patterns were observed during the course of this exercise. There was one objective that all three individuals ranked highest, and another which was consistently ranked lowest. Scores of the other four objectives ranged widely depending on the individual's perspective. Despite these differences in how objectives were ranked, the overall prioritization of alternatives was nearly identical (i.e., the decision appeared to be robust to differing values systems and uncertainty captured in model predictions). This was in large part, because the values predicted in the consequences table, outweighed any differences in objective weighting. It is important to note that predicted consequences were elicited from workshop participants for illustrative purposes only, and were not authoritative.

Uncertainty

By using a range of values when evaluating alternatives, we were able to demonstrate the degree of uncertainty surrounding the predicted outcomes of each alternative in terms of the objectives, and graphically express those uncertainties as error bars. For instance, not only did the scores for the improved depredation order alternative increase from the status quo as expected, the degree of uncertainty decreased. Intuitively, this makes sense, because that was one of the purposes for the improved depredation order alternative. In contrast, there was a great deal of uncertainty surrounding the Regional Population Regulation alternative, primarily because of the many unanswered questions concerning the details of implementing that alternative. This resulted in wider range of scores for how this alternative met each of the objectives.

A more basic source of uncertainty is whether the modeling and information collection can be completed in time for that information to be incorporated into the decision making process. A draft NEPA document and proposed rule (regulations) must start through the review process by mid-2012 in order for new regulations to be in place by the time the current depredation orders expire on June 30, 2014 (Table 6).

Discussion

Value of decision structuring

As a result of this process, there is now a clear direction on how to proceed including a list of tasks, and time line to help guide the process. In addition, there is a structured process to inform the decision making. In other words, we have the structure in place to make an informed decision that will likely be better than it would be without that structure, regardless of the availability of new information.

Further development required

It is important to explicitly consider the objectives for DCCO management at the USFWS Regional, Flyway, State, and local scales to understand the consequences of adopting a national management policy for this species. Toward this end, we will be asking for feedback from a variety of stakeholders on the objectives and alternatives developed thus far. In addition, we will be asking for explicit, detailed descriptions for any proposed alternatives.

We also need additional information to fully evaluate the final suite of alternatives relative to the final list of objectives. This additional information will likely include DCCO population modeling, surveys of action agencies and the public, and budget analysis. In order for this information to be useful, it will have to be available within the next year so it can be incorporated into a draft NEPA document and rule. This is necessary to allow 20-30 months for the review and approval process prior to the expiration of the existing depredation orders.

Most of the workshop participants will continue to serve on a Steering Committee to provide advice and feedback through this process. Committee members that were not able to attend the workshop include: Suzanne Fellows (USFWS Division of Migratory Birds, Denver, CO), Jenny Hoskins (USFWS Migratory Birds and Habitat Programs, Portland, OR), Dave Sherman (Ohio Division of Wildlife, Oak Harbor, OH), John Buck (Vermont Fish and Wildlife Department, Barre, VT), and a representative from the Pacific Flyway that has yet to be identified by that Flyway.

Subcommittees, consisting of Steering Committee members and others, will be formed to further refine the details of modeling alternatives to evaluate how they meet objectives. Of particular importance will be a subcommittee to help design and follow through with the surveys that will go out to a variety of stakeholders.

Prototyping process

It took most of two workshops to identify the appropriate scale for this decision. Prototypes developed during two previous workshops were helpful in identifying issues at the local scale that may be influenced by national policy. By the end of the second workshop, it was clear that the focus needed to be at the national scale.

On the one hand, it took over a year to get to that point. On the other side, most people involved, up until this workshop, spent two weeks or less on the process. Thus, the time

and resources that might have been spent on what at first seemed to be the appropriate scale, was avoided. In addition, the importance of human dimensions in this issue became more evident with each workshop.

The identification of our objectives, early on, gave us some guidelines throughout the rest of the SDM steps. Going through the process multiple times helped refine our alternatives, objectives, and informational needs.

Recommendations

For complex problems of involving multiple scales, it is even more important to go through the rapid prototyping process quickly. In this way, the appropriate scale of the decision may be found more quickly.

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Table 1: Decisions made regarding Double-crested Cormorant (DCCO) management by decision makers at multiple scales. The focus of this workshop was national scale decisions made by the USFWS (box highlighted in yellow), realizing that nature of linked decisions.

Scale	Decision Maker and Decision				
	USFWS	USDA	State	Tribe	Aquaculture Producer
Continental					
National	Long-term sustainability of migratory birds EIS - Depredation Orders	EIS Cooperator			
Regional	Long-term sustainability of migratory birds				
Flyway	Approve and/or modify Council recommendations		Propose & implement actions		
State	EA FONSI Rescind DO Authority	Develop EAs	Viable DCCO populations		
Local	Issue Permits Allow access to NWRs Rescind DO Authority	Action Agency Agent Issue Form 37s	Action Agency	Action Agency	Action Entity (AQDO)

Table 2: Details of the Aquaculture Depredation Order under three hypothetical alternatives.

Components of Alternative Policies: 3 examples

Aquaculture Depredation Order`			
Category	Improved DO	Liberal DO	Conservative DO
Area Covered	13 ± states	All states	7 of the current 13 states
Sites allowed	Clarify vicinity and intent	County wide	Farms/hatcheries only
Reporting Requirements	Annual by registration system Uniformity between Regions Enforced	Produced on request	Monthly by registration system Uniformity between Regions Enforced
Action Agency involved	Status quo (USDA WS)	All citizens	Status quo
Agent designation (roosts)	Status quo (allowed)	Status quo	None
Fresh/salt water	Fresh , possibly salt	Both	Status quo (Fresh)
Expiration	10 years	None	5 years
Justification Requirements	Form 37 periodically	None	Form 37 annually
Aquaculture stock	Self certification Same evidence	None	Status quo (Evidence of depredation & Non-lethal program)
Scale of Impact/action	Status quo (facilities & roosts)	State-wide	Facilities only
Level of take	Status quo (commit or about to)	No restrictions	Active depredation only
Methods guidelines			
Weapon/ammunition	Define firearms	No restrictions*	Shot gun only (non-toxic)
Disposal of birds	Add option to allow birds in ponds	No restrictions	Status quo (properly)
Attractants, decoys	Status quo (allowed)	Status quo	Prohibited
Timing of Actions			
Roosts	Status quo (allowed, Oct-April)	No restrictions, all year	Prohibited

Table 3: Details of the Public Resource Depredation Order under three hypothetical alternatives.

<u>Public Resource Depredation Order</u>			
Category	Improved DO	Liberal DO	Conservative DO
Area Covered	Add and subtract states	All states	10 of the current 24 states
Reporting Requirements (birds shot, nests oiled & destroyed)	Same justification Report by calendar year Uniformity between Regions	Justification & reporting every 2 years	High justification standard Report by calendar year Uniformity between Regions
Action Agencies	USDA WS, States, Tribes FWS on NWRs	All resource mgmt agencies All citizens	Status quo (USDA WS, States, Tribes)
Agent designation	Status quo (allowed)	N/A	No agents
Oversight/training	Mandatory training	None	N/A
Fresh/salt water	Fresh, possibly salt	Both	Fresh only
Expiration	10 years, periodic monitoring	None	5 years, annual monitoring
Justification Requirements	Uniformity between Regions	None	Prior permission; high degree of proof
Vegetation	Status quo (allowed)	N/A	Restricted to important vegetation
Fish (forage)	Uniformity between Regions	N/A	Prohibited
Resource allocation	Allowed	N/A	Prohibited
Fish (game)	Uniformity between Regions	N/A	Documented proof
Birds	Status quo (allowed)	N/A	Documented proof for TE
Wildlife	Status quo (allowed)	N/A	Documented proof for TE
Habitat	Status quo (allowed)	N/A	Essential to TE species
Scale of Impact/action	Implement guidance document	Implement guidance document	Implement guidance document
Level of take	25%*	No notification needed	>0%
Methods guidelines			
Weapon/ammunition	Specify firearms	No restrictions*	No-lead only
Disposal of birds	Add composting, but no scavenging	No restrictions	Status quo (proper disposal)
Attractants, decoys	Status quo (allowed)	Status quo	None
Timing of shooting	Moratorium during breeding season, where no-oiling**	No restrictions	Day light hours None during nestling season
	*conservative number derived from PBR	*limited by local & state laws	
	** determined by regional director		

Table 4: Outstanding questions regarding the Regional Population Regulation alternative.

- Define “regional”
 - What scale?
 - What geographic area?
- How will population objectives be established?
 - Breeding population?
 - Wintering population?
- How will birds breeding in Canada be incorporated?
- How will allowable take be allocated by State?
- How will allocated take be distributed?
 - How will this affect take by aquaculture producers?
- Where does the funding come from to implement this alternative?
- What are the implications of taking birds that aren’t directly causing damage?
 - Doesn’t this just shift the public pressure to the National level?
- What if this alternative does not have the desired affect and there are still local conflicts?

Table 5: Consequences table used to evaluate a suite of alternatives based on measurable objectives.

Objective	Measure	Alternatives				
		Status Quo	Improved Depredation Order	Liberal Depredation Orders	Conservative Depredation Orders	Regional Population Regulation
Viable DCCO Breeding Population in 5 Zones	Binary (Yes/No)					
Minimize impacts to migratory birds and listed species	Risk of take (MBTA) (1-5 scale)					
	Risk of take (ESA) (1-3 scale)					
Maximize ability to manage DCCO conflicts	Survey of end user's ability to address conflicts (+3 to -3 scale)					
Maximize social acceptance of DCCO management	Public acceptance survey (+3 to -3 scale)					
Minimize action agency cost to implement regulations	Management, safety, and administrative costs (\$)					
Minimize USFWS cost to oversee implementation	Administrative cost (\$)					

Table 6: Timeline for rule making and National Environmental Policy Act (NEPA) document approval is a 20-30 month process, meaning a draft NEPA document and proposed rule need to be prepared between January 1 and November 1, 2012.

Activity	Length of process	Cumulative Clock
Draft NEPA Document and Proposed Rule		0
Surname Process	2 months	2 months
OMB Review	1-3 months	3-5 months
Incorporate OMB Comments	1 month	4-6 months
Public Comment Period	3 months	7-9 months
Address Comments and Incorporate Changes	2-4 months	9-13 months
Final Rule Approval Process	9-15 months	18-28 months
Final Solicitor Office approval	May 1, 2014	
Publish Final Rule, NEPA, ROD, & FONSI	May 31, 2014	19-29 months
Rule goes into effect	July 1, 2014	20-30 months

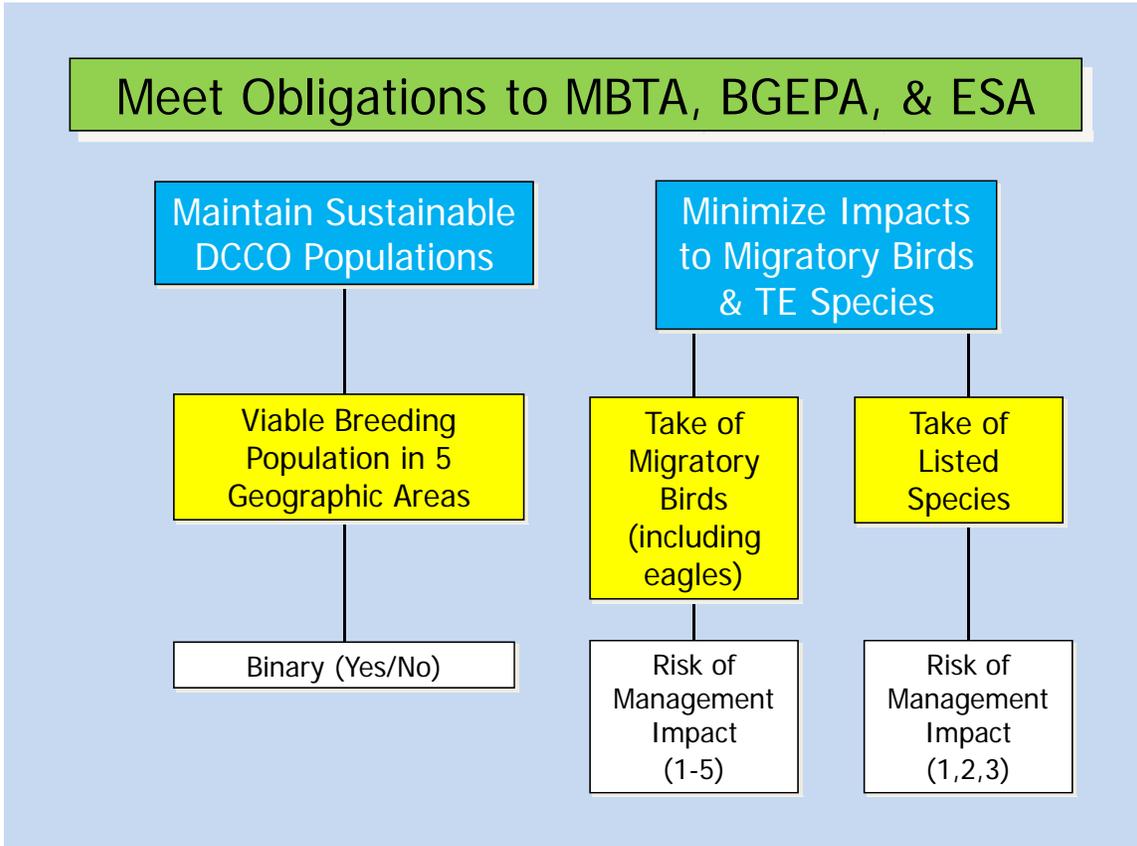


Figure 1. Means objectives and measurable attributes for meeting obligations under the Migratory Bird Treaty Act, Endangered Species Act, and Bald and Golden Eagle Protection Act fundamental objective.

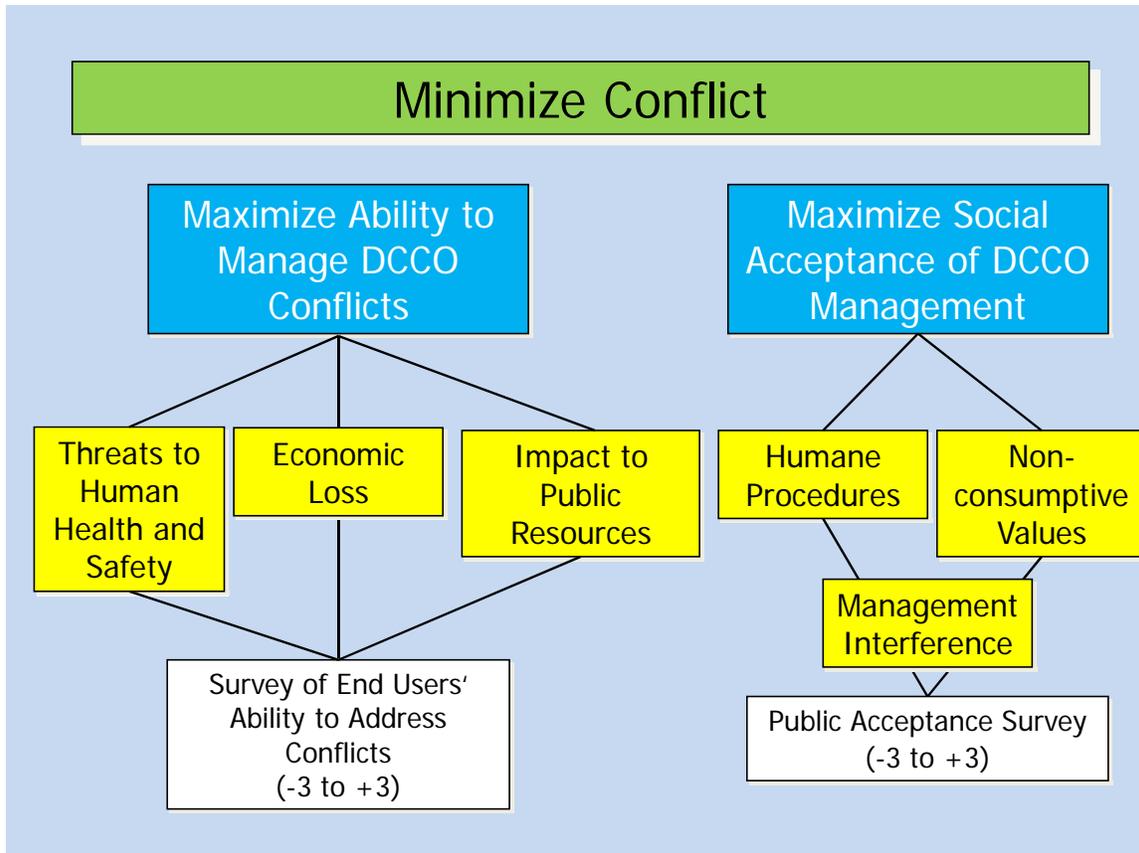


Figure 2. Means objectives and measureable attributes for the minimizing conflicts fundamental objective concerning Double-crested Cormorant (DCCO) impacts and management actions taken.

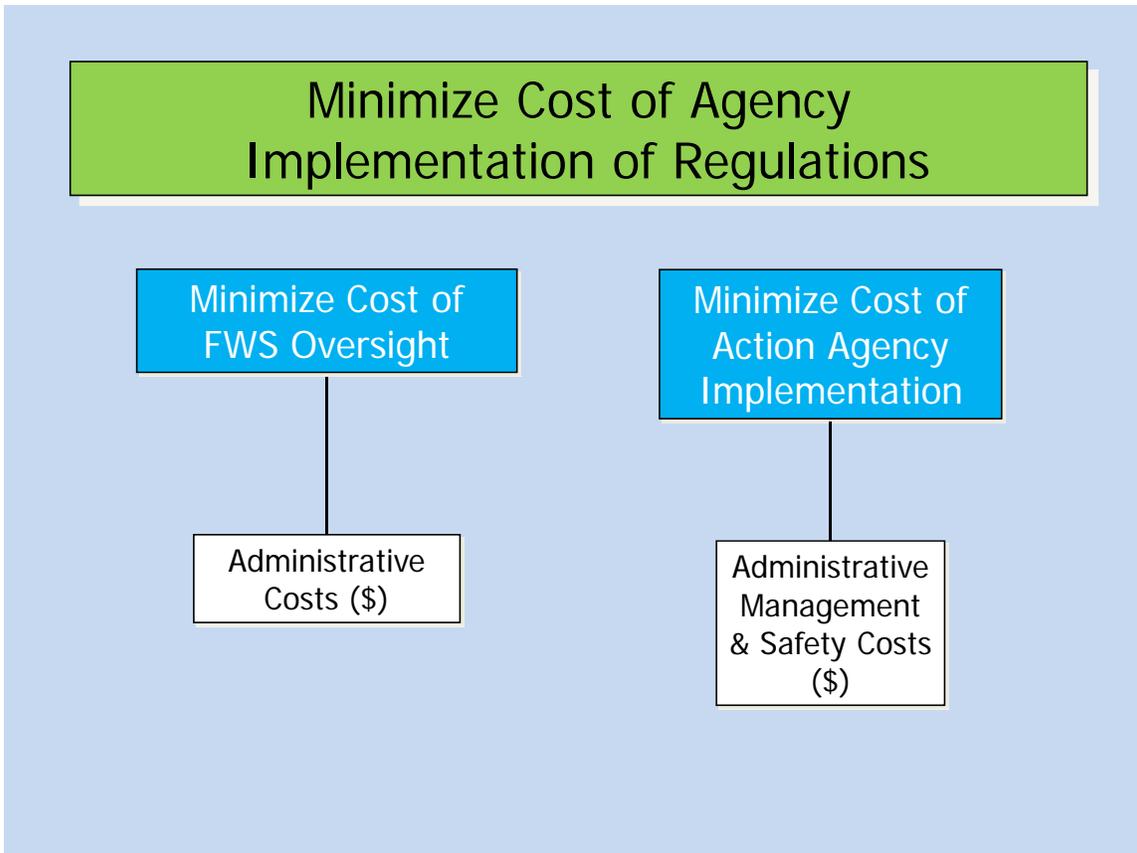


Figure 3. Means objectives and measureable attributes for minimizing the costs of implementing regulations fundamental objective.