THE APPLICATION OF CONSERVATION EQUIVALENCY IN ASMFC FISHERY MANAGEMENT PLANS

Prepared by Andrew J. Loftus[1] and Dr. Lisa L. Kline[2]

Workshop Planning Subcommittee Members

Charles Lesser, Chair
Gordon Colvin
Joe Fessenden
Najih Lazar
Laura Lee
Andy Manus
Harry Mears
John Merriner
Rob Winkel

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[1] Andrew J. Loftus, 3116 Munz Drive, Suite A, Annapolis, MD 21403; Phone (410) 295-5997; Aloftus501@aol.com

[2] Dr. Lisa L. Kline, Atlantic States Marine Fisheries Commission, 1444 Eye Street NW, Suite 600, Washington, DC 20005; Phone (202) 289-6400; Lkline@asmfc.org

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CONTEXT

This paper is prepared as a tool to guide a discussion of the use of conservation equivalency in Atlantic States Marine Fisheries Commission (ASMFC) fishery management plans. The content of this paper is not intended to judge the appropriateness or inappropriateness of any management action nor is it intended to offer explicit solutions to issues regarding conservation equivalency. However, it is anticipated that the next phase of this project (a workshop on conservation equivalency, October 17, 2001) will result in definite recommendations for refining the application of this management tool. For complete discussions regarding individual fishery management plans referenced, please refer to those management plans.

BACKGROUND

The ASMFC has defined "Conservation Equivalency" as:

> *Actions taken by a state which differ from the specific requirements of the fishery management plan, but which achieve the same quantified level of conservation for the resource under management. For example, various combinations of size limits, gear restrictions, and season length can be demonstrated to achieve the same targeted level of fishing mortality. Conservation equivalency will be determined by the appropriate Management Board.*
>
> Source: Interstate Fisheries Management Program Charter

For all practical purposes, the effective application of conservation equivalency in ASMFC management plans began in 1989 and has expanded since then. However, there has been no comprehensive review of the way that this process is applied in the development of fishery management plans. This paper is intended to provide the basis for that review, discussion, and evaluation to occur.

HISTORICAL PERSPECTIVE

Prior to the Atlantic Striped Bass Conservation Act of 1984, and later the Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA) of 1993 for other species, state implementation of ASMFC plans contained only "recommended" actions. As a result, state fishery regulations generally followed the desires of the fishing constituents over the recommended actions contained within the plans.

The first amendment to the Fishery Management Plan for Striped Bass to follow the enactment of the Striped Bass Act (Amendment III in 1985) *required* states to adhere to a standard minimum size limit (which changed each year as fish grew), with no deviation to smaller sizes. These limits were designed to protect 95% of the 1982 and subsequent year classes until they had a chance to spawn at least once. The only deviations from these regulations were more restrictive and often came in the form of fishery closures.

The opening of the striped bass fishery in 1990 under a "recovering" status changed the management landscape from a clearly defined "protection of a year class" to a less well defined "controlled harvest of a population." The first practical application of conservation equivalency came in Amendment IV to the Striped Bass Management Plan (approved in 1989) that established guidelines for harvest in this recovering fishery. Due to differences in the availability of striped bass in "producer" areas such as the Chesapeake Bay as compared to coastal waters, fisheries in producer areas were allowed to deviate from the standard coastal fishing regulations governing size, creel, and commercial harvest (USDOC 1998). States granted such deviations, primarily those in the Chesapeake Bay, were made to carefully monitor harvest through in-season monitoring and calculation of fishing mortality through a "harvest control model."

Since that time, several other ASMFC fishery management plans have applied conservation equivalency principles, including those for weakfish, summer flounder, tautog, scup, and bluefish. A brief summary of the application of conservation equivalency in some of these plans reveals unique characteristics of how and why the principle has been applied.

UNIQUE ATTRIBUTES OF APPLICATION

Weakfish

Status: Recovering; increasing in abundance
Unique Feature of Conservation Equivalency: Developed at the outset of recovery efforts.

The initial Weakfish Management Plan was developed in 1985, prior to the ACFCMA of 1993. However, Amendment II of the plan in 1994 provided the first conservation equivalency component for weakfish management. This Amendment and Amendment III included a comprehensive "evaluation manual" and tables that guide states through the options of size and creel limits. These provided clear guidance to the states on the acceptable range of options, alleviating the need for individual states to devise and defend their own measures.

Summer Flounder

Status: Overfished but increasing
Unique Feature of Conservation Equivalency: Developed in response to adverse implications of standard restrictive harvest measures.

Although the first Summer Flounder Management Plan was developed in 1983, conservation

equivalency was not incorporated until the 1999 fishing year. Since this plan was jointly developed and implemented with the Mid-Atlantic Fishery Management Council (MAFMC), these initial conservation equivalency guidelines are considered "interim." In 2001, these guidelines were incorporated as part of the overall plan framework.

Rather than being incorporated as a proactive measure to restore the fishery, conservation equivalency was implemented in response to adverse implications that would be caused by standard *coastwide* recreational fishing regulations in the 1999 fishing year. These standard regulations were designed to reduce recreational landings by 41%, and consisted of a 15 inch minimum size, 8 fish possession limit, and closed season January 1-May 28 and September 12-December 31. Had these standard regulations been adopted by every state, they would have resulted in a wide disparity in reductions for individual states ranging from 10.7% in Massachusetts to 69.6% for North Carolina (due to varying availability of the summer flounder in different states during the proposed season). In general, states in the southern range of summer flounder would have borne a disproportionate burden of the reduction (MAFMC 2001).

In place of the standard regulation, in 1999 states were allowed to implement conservation equivalency measures so that *each state's* reduction was no less than 41% or they could choose the standard coastwide regulation. The success of the initial years of conservation equivalency in controlling summer flounder recreational harvest is being debated. In 1999, although recreational harvest declined under conservation equivalency, it still remained well above the target level. In 2000, the conservation equivalency measures resulted in a harvest that was approximately double that which was allowed under the plan, as measured by the MRFSS. Therefore, the actual reduction in the 2001 harvest for each individual state was modified based on their success at achieving reductions in those early years. States that exceeded their harvest targets were required to implement stricter regulations than those that did not (see discussion on "Interaction of Regulations" later in this paper)..

Scup

Status: Overfished; likely increasing abundance

Unique Feature of Conservation Equivalency: Conservation equivalency established for only a subset of states.

The initial plan for scup was implemented in 1996. This plan followed closely the MAFMC plan and required states to adopt provisions of that approved plan. Since the scup plan is closely tied to the summer flounder plan, many of the framework provisions are similar, in that they provided for a single, coastwide regulation for reducing the recreational harvest prior to 2001. Addendum II, approved in January 2001 by the ASMFC, established a harvest target for the recreational fishery that would require significant reductions from the 2000 landings. Due to regional differences in the fishery and landings, states south of Delaware were required to enforce a standard 8 inch size and 50 fish bag. However, states to the north (Massachusetts through New Jersey) were allowed to implement measures to achieve a minimum 33% reduction in harvest

(including a 9 inch minimum size). Tables were provided that outlined the anticipated reductions that states could expect with various seasonal closures and size limits.

Tautog

Status: Overfished; increasing abundance

Unique Feature of Conservation Equivalency: Targets are not focused on, or measured by, harvest limits (number or weight) but rather on reducing fishing morality (F).

The first tautog management plan was implemented in 1996. The stock assessment indicated that there was insufficient data to accurately estimate population size coastwide, but that estimates of fishing mortality (F) could be made. Due to this factor, there were no specific harvest reductions (in terms of number or weight of fish) specified. Rather "reduction in F" was specified as a goal on a state by state basis. In addition, a minimum size of 14" was implemented to protect younger age classes. The management plan provides tables of reduction in F that individual states could be expected to achieve at various possession limits and season closures. This alleviates the need for individual states to devise and defend their own strategies.

Bluefish

Status: Overfished; low level of abundance

Unique Feature of Conservation Equivalency: First joint ASMFC/MAFMC plan to incorporate conservation equivalency.

Development of the bluefish management plan in 1989 preceded the enactment of the ACFCMA of 1993. This was the first joint plan of the ASMFC and the MAFMC to incorporate conservation equivalency provisions. These provisions were extremely limited, with only one state applying for, and being granted, a waiver from the standard recreational coastwide creel limit (10 fish). Using tables of catch at various sizes contained in the plan documentation, Georgia successfully made a case that their adoption of a 12 inch minimum size and 15 fish limit was equivalent to the standard coastal creel limit. The remaining states and the EEZ adopted the standard creel limit. The bluefish management plan does not contain explicit tables of equivalent actions that a state may rely on and, therefore, it is incumbent upon each state to develop and defend data needed to prove such equivalency.

OTHER APPLICATIONS OF THE "CONSERVATION EQUIVALENCY" CONCEPT IN RESOURCE MANAGEMENT

Lake Erie Walleye Fishery

Although the Great Lakes states do not use the term "conservation equivalency," many of the provisions of their management regimes share characteristics of this concept.

In Lake Erie, the percid fishery (walleye and yellow perch) are managed on a lakewide basis between five jurisdictions (the states of Ohio, Michigan, Pennsylvania, and New York and the

Canadian province of Ontario). Some jurisdictions have predominately recreational fisheries, while others (notably Ontario) have predominately commercial fisheries.

Using lakewide modeling of walleye stocks, the jurisdictions collectively establish a target F for the lake as a whole. This mortality target is then converted into a total allowable catch (TAC). The TAC is divided among jurisdictions based on the percentage of surface water in each jurisdiction. Individual jurisdictions develop their own regulations to maintain their harvest within their allotment. In general, the jurisdictions are comfortable with their scientific ability to manage the fishery in this manner. There are no penalties for states that exceed their quota, but generally there is good cooperation among jurisdictions for management.

Similar to many Atlantic coast species, walleye of different life stages migrate within the lake. For example, Ohio is able to conduct a spring fishery due to production of walleye in two of their reef complexes and the Maumee and Sandusky Rivers. Neighboring Pennsylvania cannot conduct such a fishery due to unavailability of fish at that time.

Currently, many of the sport fishing regulations between jurisdictions are similar out of choice not necessity. Many enforcement problems are addressed through separate bag limit and possession limit laws. While on the water, anglers must adhere to the regulations in the waters where they are located, including being licensed in that jurisdiction. Thus, for example, if Ohio was to have a higher bag limit than Michigan, a Michigan resident fishing in Ohio waters (with an Ohio license) catches a full Ohio creel (under Ohio regulations) must land the fish in Ohio. At the point that the fish is landed, it falls under “possession” laws that generally allow the angler to transport the fish into Michigan over land.

Migratory Waterfowl Harvest

Migratory Waterfowl (geese, ducks, etc.) that are harvested throughout many jurisdictions are managed through an international agreement. Each year, models incorporating adaptive harvest strategies are used to predict the harvestable surplus, if any, of species for each specific population. These models incorporate parameters including population estimate and the prior years’ harvest in each state. The models also contain measures of uncertainty in the data and are considered relatively risk averse in their determination of harvestable surplus.

The purpose of annual hunting regulations is to keep harvests at levels compatible with a population's ability to maintain itself (USFWS 2001). Season length (number of days) is considered to be the primary influence on harvest rate. Although bag limit (number of birds/hunter/day) is also a factor, it is considerably less important than season length. In areas where populations are doing well, both season and bag limit are more liberal. Conversely, where populations are doing poorly, the regulations are restrictive. For example, in some portions of the Atlantic flyway, there has been no open season for migratory Canada geese since the mid 1990's because of low populations and little projected harvestable surplus.

Once a harvestable surplus is determined, an important assumption in deciding season length is that each state will choose the days for their state that will maximize the allowable harvest. Thus, the projections incorporate the "worst case" scenario (the maximum harvest that is likely to occur) and is considered "risk averse." Typically, states are not allowed to extend their season if harvest falls below projections, except in unusual circumstances (very long periods of non-huntable days, etc.). Contrary to this, many ASMFC management plans allow jurisdictions to extend seasons if harvest is not approaching the allowable level in a given year or reallocates harvest quotas within season if one sector is under-harvesting their quota (i.e., bluefish).

WHY USE CONSERVATION EQUIVALENCY?

State Flexibility - Conservation equivalency was integrated into the ASMFC management process as an added measure of maintaining state flexibility in managing fisheries within their waters. The integration of this flexibility is consistent with the philosophy behind the key legislation impacting the ASMFC process. The ASMFC Compact, Atlantic Striped Bass Conservation Act of 1984, and the ACFCMA of 1993 were all developed to maximize individual state flexibility in managing its fisheries while providing coordinated coastwide conservation plans. These laws do not dictate the contents of the state-developed plans, unlike the Magnuson-Stevens Act which mandates National Standards that must be met for plans developed by the fishery management councils (or others implemented by the Secretary of Commerce). Rather, the ASMFC plans are governed by standards developed by the states and detailed in the Interstate Fishery Management Plan charter.

Adaptation to Local Fishing Conditions - The application of conservation equivalency allows states to adapt coastal management plans to localized fishing conditions. Because of life history factors, the fishable portion of a stock may only be accessible to an individual state during a specific window of time. Striped bass in producer areas, flounder on the coast, etc. are all examples of applying conservation equivalency to adapt a coastal plan to state-specific fisheries and fishing conditions.

Allowing states to adapt regulations for fishing conditions also allows the opportunity to adapt regulations to accommodate specific socio-economic conditions. Businesses are built to support both recreational and commercial fishing activities, and regulations can have a profound impact on these businesses. For example, a "one size fits all" size limit on a species could preclude the harvesting of the prime market size fish for a commercial fishery and dramatically impact not only the harvesters, but processors, suppliers, and retailers. The application of conservation equivalency measures can support these economies while achieving the biological management objectives.

Perceived equity by the public - Allowing individual states to adapt conservation goals to its specific fisheries and fishing publics provides a measure of "equity." For example, asking the anglers of North Carolina to endure nearly a 70% reduction in harvest under standardized

regulations designed to reduce *coastal* harvest by 41% may not be considered by the residents of that state to be equitable. However, through conservation equivalency measures, each state, including North Carolina, must reduce state harvest by 41%, a level that may be considered more justified to that state.

DRAWBACKS OF CONSERVATION EQUIVALENCY

Law Enforcement- One of the significant difficulties with conservation equivalency is law enforcement, particularly in areas adjacent to jurisdictional borders. Differing regulations between state jurisdictions, as well as between states and the exclusive economic zone (EEZ) (i.e., size limits, seasons, creel limits), can result in angler confusion as well as law enforcement problems. Interstate transportation of commercially and recreationally caught fish can also compound these problems. Fish caught legally in one state's waters may not be legal upon returning to another state. Different seasons, creel limits, possession laws, and size limits may apply in a matter of a few yards when on the water. In the Lake Erie walleye example, states are able to enforce laws based on licenses issued by each jurisdiction. However, most states on the Atlantic coast do not have a marine recreational fishing license that would allow this approach for similarly managing recreational fisheries.

User compliance with regulations - "The value of simple regulations" is an oft quoted term in fisheries management. The more complex that management regulations become, the harder it is for users (anglers, commercial fisheries, etc.) to comply with those regulations. With conservation equivalency in place, fishermen traversing several jurisdictions in a single fishing trip (including the EEZ) could encounter multiple sets of regulations. For example, in the Potomac River, within a matter of yards anglers can be fishing under the regulations of three different management entities. Thus, increasing the complexity of the regulatory measures can hinder the ability of even the most conscientious of users to comply with them.

Consistency with the Exclusive Economic Zone (EEZ) - Fisheries managed under ASMFC management plans that also occur in the EEZ (generally those waters between 3 and 200 miles offshore) produce a unique set of additional problems. Although these problems are not exclusively related to conservation equivalency, the application of different regulations in state jurisdictions can increase complexity of management and enforcement. The National Standards mandated through the Magnuson-Stevens Act stipulate that "conservation and management measures shall not discriminate between residents of different states." This factor, combined with the shear difficulty of enforcing multiple regulations in the EEZ, will likely mean that differing regulations between the EEZ and individual states will continue to exist under management involving conservation equivalency.

Monitoring Compliance by ASMFC - From the management planning standpoint, standard regulations may be more easily monitored by ASMFC. It is much easier, and cost effective, to establish a set of management guidelines that all may adhere to than to evaluate several different

management activities and decide if they are indeed in compliance with the overall coastwide goal. Standard "tables" of options such as are currently provided in several of the fishery management plans allowing conservation equivalency may alleviate this to some degree.

Perceived inequity by the public - To managers involved in the management process, it may seem perfectly clear and reasonable why neighboring states have different regulations. However, to the public that is not involved in the management process, such disparities can seem extremely inequitable. Why are striped bass anglers in producer areas able to harvest fish before their coastal counterparts "get a shot at them?" Why is the coastal fishery for striped bass open year round while that in producer areas is not? These questions and many more can arise when regulations differ between jurisdictions.

Interactions of Regulations - Conservation equivalency adds one more layer to a complex management system and must be conducted in the context of other regulations that are being implemented. For example, in the management of summer flounder, for the 2001 fishing year states were required to reduce recreational landings by at least 41% based on 1998 landings. However, since some states' regulations in the previous years did not achieve the needed reductions, those states were required to enforce regulations that were more restrictive than others that had achieved reductions in those years. As a result, the actual reduction in state landings once these "overages" were applied ranged from 57% for Rhode Island to 4% for Virginia. Neighboring states sometimes had large differences. Delaware was required to implement regulations to reduce landings by 48% while New Jersey had more liberal reductions pf 34%, creating the perception of inequity among some in the recreational fishing community.

Economic considerations - Industries that depend on fisheries are dramatically impacted by regulations. If one jurisdiction's regulations provide a competitive advantage over another, this could significantly impact the industries. For example, questions have ben raised by the charter boat industry of whether they should be required to adhere to regulations in the state in which they are registered or the state in which they are fishing. The resolution to this issue could dramatically impact the charter industry, but each solution has different implications for the management measures of individual states. More liberal regulations in one state may draw anglers, commercial fishermen, or charter operators to that state to the detriment of other states' economies. At the same time, the state that has attracted the influx of harvesters must now reevaluate its management options and level of harvest so that it maintains its target harvest established under the conservation equivalency guidelines.

Technical Issues -

Ecological Considerations - Quantifying the impact of multiple management regulations can be extremely complicated. From the ecological standpoint, harvesting fish at different stages of their life cycle naturally impacts the stock status at all subsequent life stages. Yet, depending on the management objective and life cycle of the species, it may be necessary to harvest a certain portion of a wide variety of age classes to obtain the desired outcome. However, data needed to

reliably model and predict these effects are often not available or are of tenuous nature. The problem is exacerbated by an increasing number of management regulations and management regimes, or when adequate data collection programs are not implemented to track the impact of each of these regimes.

The uncertainty regarding the ecological impact of conservation equivalency measures is summed up in this statement from the fish-community objectives of Lake Michigan (Eshenroder et al. 1995):

> "....Management actions are inexact. Their effects cascade through the food chain to species well beyond those targeted, and those effects can have different time scales for different species. Short-term responses can be deceptive and long-range predictions can prove difficult. .....Fish-community objectives for an entire lake cannot be taken to a high level of exactness-they are reasoned likelihoods. Management initiatives aimed at achieving objectives will continue to have a large experimental component, and the time frame needed to meet some objectives will be measured in decades."

Technical Capability -The technical ability of current day stock assessment techniques to measure the impact of different regulations is limited. Although it is common to establish fishing mortality levels at two or even three decimal places, questions have been raised about the ability to truly measure to this precision. Is an F of .35 really different than an F of .29, or do they both fall within the same level of confidence? With adequate data sets of sufficient sample size, stock assessment scientists may be able to place confidence intervals on some estimates. But as sample sizes are broken down into smaller units (by state, region, etc.). It may become more difficult to reliably estimate fishing mortality associated with specific management.

In addition, the migratory nature of species managed under ASMFC plans also impacts managers' abilities to truly evaluate the impact of harvest. Although the life history of species that reproduce in one jurisdiction and spend their adult life in other jurisdictions may be understood, modeling the impact of harvest at these different life stages can become extremely complex and uncertain.

Does the sum of the parts equal the whole - In theory, measures implemented under conservation equivalency should equate to the same impact as a standard coastwide measure. As more and more disparate data sets, monitoring programs, etc are introduced and applied to individual state fisheries rather than combined into the coastwide analysis, the level of uncertainty as a whole *may* begin to increase. For example, it is commonly accepted that the Marine Recreational Fisheries Statistics Survey (MRFSS) was not designed to monitor quotas on a state by state basis. Yet, that is exactly what is entailed in many conservation equivalency programs. In the management of tautog, Rhode Island has struggled with applying different regulations to the charter (for hire) fisheries and private boat recreational fisheries by using data from the MRFSS. However, the level of uncertainty created by splitting the data to this small of a level has

precluded this. In some cases, the uncertainty can be moderated by requiring a certain level of error that will be allowed in estimates before such measures are approved (such as in the summer flounder plan requiring the proportional standard error to be below 30%). As the coastwide estimate of mortality is fractured into smaller "pieces" of mortality (state, region, etc) more error can be expected to be introduced.

Resources of individual states- In the absence of standard tables or guidance manuals, such as those provided in the weakfish management plan, conservation equivalency management can become very expensive for states to develop independently. Comprehensive data sets must be compiled - a very expensive proposition. Stock assessment scientists with the capability, resources, and time to develop models of population, exploitation, etc. must be employed. Additional time is required for these scientists and managers to participate in various ASMFC committees to defend and justify their findings. Finally, conservation equivalency may require additional resources to monitor the fishery to assure compliance. Thus, conservation equivalency could create a system where smaller states, or those with fewer fiscal resources, may be at a disadvantage when it comes to participating in the management programs.

CONCLUSION

As mentioned at the beginning, conclusions and solutions were not the objectives of this paper. The thoughts expressed here provide fodder for these conclusions to be developed during the workshop on conservation equivalency to be held October 17, 2001 at the ASMFC Annual Meeting in Rockland, Maine.

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