

WEST COAST FORUM 2012 NATIONAL STANDARD 1 & OPTIMUM YIELD

Summary and Discussion Themes

Monterey, CA
September 4-7, 2012

The Fisheries Leadership & Sustainability Forum (“Fisheries Forum”) promotes professional development and continuing education by bringing together fishery managers and experts from a range of disciplines. The Fisheries Forum offers fishery managers opportunities to share experiences, build leadership skills, and enhance their understanding of fisheries law, policy, science, and economics. The semi-annual forums are the cornerstone of the Fisheries Forum’s work and provide members and staff of the regional fishery management councils with access to the latest research and an opportunity to discuss challenges and share success stories across regions. The forums focus on learning from experience and applying knowledge and problem solving skills to real world challenges.

For more information about the forums and to view material from past forums, please visit the [Fisheries Forum website](#).

Introduction: Forum agenda and objectives

The 2012 West Coast Forum (Forum) engaged participants in discussion on the topic of optimum yield (OY) and National Standard 1 (NS1). Through presentations, facilitated discussions and small breakout groups, the Forum agenda encouraged a critical examination of the National Standard 1 mandate, including the challenges and opportunities presented by its implementation. Many of the Forum’s discussions focused on sharing examples of how different councils approach optimum yield, and the broader question of how the objective of achieving optimum yield should guide the way Regional Fishery Management Councils (councils) manage their fisheries.

Throughout the Forum’s discussions, several major themes emerged. Many participants noted that while their councils do not engage in explicit conversations around optimum yield, councils are in fact addressing the considerations associated with optimum yield while exploring management alternatives and making policy decisions. Over the course of two days, optimum yield evolved from its initial characterization as a number to a much broader and more meaningful concept: a strategic vision to guide the entire council process. Forum participants suggested how the achievement of and management toward optimum yield could be facilitated by revisions and clarifications to the NS1 guidelines. Specific suggestions

included: reevaluating the temporal scale for which overfishing is determined, providing additional guidance on the management of multispecies fisheries and stock complexes, and clarifying the application of ecosystem component species classifications.

The Fisheries Forum conducted an extensive scoping process to ground the Forum agenda in operational realities and ensure relevant discussions across council regions. Forum participants included council members and their designees, council executive directors, council staff, state and federal agency representatives and academic experts. The Forum provided participants with an opportunity to:

- Enhance their understanding of NS1 and optimum yield;
- Identify successes and challenges to achieving optimum yield, and examine how different councils have interpreted and implemented NS1;
- Discuss how the NS1 guidelines currently provide a framework to support councils in achieving optimum yield, and where additional support may be needed;
- Explore innovative approaches for evaluating tradeoffs and balancing competing objectives through the council decision making process;
- Build skills to lead their council in structuring and facilitating tradeoff discussions; and
- Exchange ideas and opinions relevant to the Advanced Notice of Proposed Rulemaking to revise the NS1 Guidelines.

The timing of the Forum created a unique opportunity to explore several of the topics identified in the May 2012 Advanced Notice of Proposed Rulemaking (ANPR) to revise NS1 Guidelines. While the discussions at the Forum provided participants with valuable insight and ideas, the Forum discussions and summary document do not represent formal comment on the ANPR.

The following summary is organized chronologically and contains brief summaries of the introductory and tools training presentations as well as an overview of main themes from the rotating breakout groups and facilitated discussions. This summary is not intended as a comprehensive report on the Forum proceedings; rather, it is meant to provide an overview and to capture salient themes from the Forum's discussions. A full list of Forum resources, including the final agenda, is available on our website at: www.FisheriesForum.org

Forum Summary

Setting The Stage: National Standard 1 And Optimum Yield

The Forum began with two introductory presentations to review the current guidance for National Standard 1 and provide a common understanding of the concepts and application of maximum sustainable yield (MSY) and optimum yield.

Maximum Sustainable Yield and Optimum Yield Concepts

Dr. Richard Methot [PDF](#) [Video](#)

National Stock Assessment Coordinator, Office of Science and Technology,
NOAA Fisheries

Dr. Methot reviewed the language of National Standard 1 and the concept of maximum sustainable yield from a theoretical and practical perspective. He discussed the relationship of status determination criteria to MSY and abundance, and the different types of overfishing that can occur as a result of uncertainty and management control. Dr. Methot outlined the differences between catch-based and mortality-based methods to measure overfishing, and the sensitivities of the methods to scientific and management uncertainty. He explained how a probabilistic approach (p^*) can be used in some cases to quantify buffers between targets and limits, and noted the tradeoff between balancing acceptable probability of exceeding overfishing limits and the potential for forgone yield. Dr. Methot concluded his presentation by sharing Management Strategy Evaluation (MSE) simulations as a tool for projecting management outcomes and visualizing optimum yield tradeoffs under different rebuilding scenarios.

Optimum Yield Application

Galen Tromble [PDF](#) [Video](#)

Chief of Domestic Fisheries, Office of Sustainable Fisheries, NOAA Fisheries

Mr. Tromble's presentation focused on the policy and application of optimum yield. Reviewing the original definition of 'optimum' in the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), he outlined how the definition has evolved over time and highlighted the factors and considerations involved in determining optimum yield. Councils have utilized a number of different approaches when specifying OY in their fishery management plans (FMPs), such as $OY = \text{annual catch limit (ACL)}$, $OY = \text{the amount of fish harvested pursuant to current regulations}$, and $OY = \text{zero}$ in instances where the council determined no harvest should occur. Several FMPs define OY with respect to MSY, such as specifying OY as equal to or a percentage of MSY or an MSY proxy, or specifying OY as equal to or a percentage of the yield associated with the fishing mortality rate associated with MSY (F_{MSY}) or an MSY proxy ($F_{MSY \text{ proxy}}$). Mr. Tromble discussed the relationship between the concept of optimum yield and the implementation of ACLs, noting the synergies and challenges in reconciling these two management requirements, and the long-term nature of OY vs. the annual nature of ACLs.

Optimum Yield Across Council Regions

Utilizing the conceptual ACL process as a visual framework, Forum participants shared examples of how and where the considerations associated with optimum yield have been incorporated. These examples highlighted how economic, social and ecological factors come into play throughout the entire ACL process. Participants also shared examples of how the components of ‘greatest

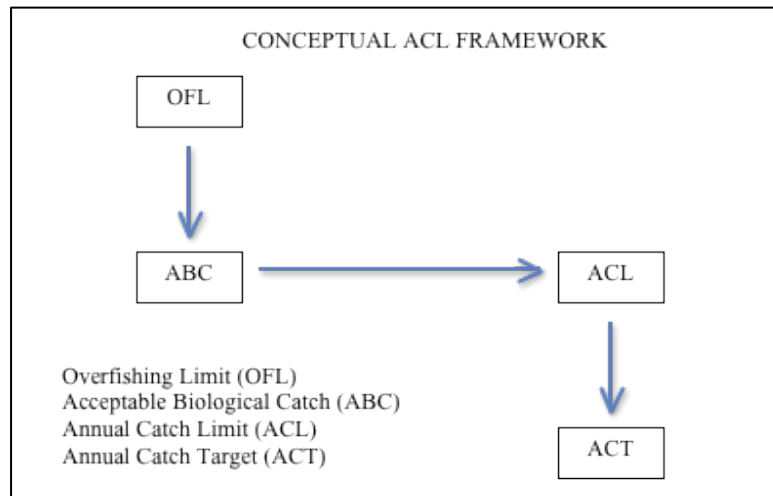
overall benefit to the nation,’ as defined in the Magnuson-Stevens Act – food production, recreational opportunities and protection of marine ecosystems – have entered into council decisions. Optimum yield considerations are frequently discussed in context of:

- Allocation decisions, predominately between commercial and recreational sectors;
- Allocation of target and non-target stocks within and across fisheries;
- The role of ecosystem considerations in setting management reference points; and
- Tradeoffs between long-term and short-term social and economic impacts.

Mapping examples of defining and achieving optimum yield to the ACL framework was an illuminating exercise. The relationship between OY considerations and the ACL process was challenging to articulate because considerations of social, economic and ecological factors and the greatest benefit to the nation are not explicitly conducted within the context of optimum yield. In practice, these discussions are often framed around a specific council action or fishery management plan (FMP) amendment rather than discussed with respect to achieving optimum yield. Despite the perceived disconnect between the objective of OY and the ACL process, the shared examples demonstrated that councils are in fact providing significant consideration to OY. However, instead of explicitly addressing OY as a single, prescribed quantity, councils incorporate OY considerations on a continuing basis throughout the council process; OY can, in some cases, be defined as the collective product of many separate policies and management actions.

The Utility of Optimum Yield

Building on the previous session, participants discussed the relationship between optimum yield and the process for specifying ACLs, reflected on where optimum yield fits within the larger management framework, and contemplated how the mandate to achieve optimum yield should guide fisheries management in the future. Below is a description of the major themes of discussion.



Optimum Yield and the ACL Framework

The group's discussion highlighted a lack of clarity regarding the interplay between OY and the ACL framework. Participants suggested that some of this confusion might arise from trying to reconcile the following differences:

- The ACL process is a discrete, systematic process for incorporating scientific and management uncertainty while OY instructs consideration of less tangible goals such as 'greatest overall benefit to the nation';
- The ACL process is applied to specify annual limits while OY is intended to place focus on longer-term goals; and
- The ACL process is applied on a species by species basis whereas the scale for OY may be much broader to include multispecies fisheries and/or ecosystem based management.

Optimum Yield and the Council Process

Several participants proposed that optimum yield warrants application within a broader context, noting that optimum yield in fact spans the entire management process. Almost every action a council takes considers the greatest overall benefit to the nation and/or takes into account economic, social, and ecological factors. It was suggested that perhaps optimum yield is less about a number and more about articulating the rationale for management decisions and balancing multiple, often conflicting objectives. From this vantage point, optimum yield is not an operational component that can be completed but rather a guidepost for the entire management process.

The Future of Optimum Yield

Despite the perceived ambiguity and complexity surrounding optimum yield, Forum participants emphasized its importance as a backbone to the Magnuson-Stevens Act. The group considered how optimum yield can be better integrated into management, and suggested that a prescribed, formulaic approach would likely detract from its utility. Perhaps optimum yield would best serve councils as a platform for evaluating tradeoffs, providing explicit rationale for council decisions and building a stronger administrative record.

Breakout Group Rotations

The Forum featured a series of breakout sessions in which participants explored three common challenges within the context of optimum yield. Each breakout session was structured to encourage innovative thinking across council regions by deconstructing challenges and identifying potential solutions. During the discussion of potential solutions, the group began to consider which ideas may be feasible within the current management framework and which ideas might require regulatory changes or additional guidance. Determining the process for implementing these ideas would require regulatory and legal review, and thus is beyond the scope of this discussion. The following breakout session summaries are not comprehensive in their description, but aim to highlight some of the themes resulting from the group's discussions.

Temporal Flexibility and Optimum Yield

Current NS1 guidelines instruct councils to set management targets and determine a stock's status in the context of a single fishing year. While the Magnuson-Stevens Act requires that catch limits be established on an annual basis, the Act does not specify the time frame on which overfishing is determined. The NS1 guidelines interpret overfishing as occurring when a stock or stock complex is subject to a level of annual harvest that jeopardizes its capacity to produce MSY.

During this breakout session, Forum participants discussed how these temporal constraints inhibit achievement of optimum yield and identified a number of challenges with applying catch limits and status determination criteria on an annual basis. These challenges include:

Stability of catch limits – Establishing ACLs in response to the most recent stock assessments can result in radically fluctuating catch limits. This instability in catch levels can have significant economic and social impacts on stakeholders.

Timeliness of and confidence in data – The annual nature of catch limits necessitates frequent stock assessments. Given resource constraints, frequent scientific assessments are not feasible for most stocks. Basing stock projections on old assessments may increase uncertainty and compound errors.

Alignment of temporal frames – The annual management timeframe is not always aligned with the temporal life history characteristics of a stock, and may not accommodate fluctuations in abundance or differences between year classes.

Management burden – Specifying catch limits on an annual basis presents an administrative burden to councils and limits their ability to respond to other issues and focus on longer-term management.

Multispecies fisheries – Annual catch limits can constrain optimization of catch in multispecies fisheries, and result in underutilization of some stocks.

In response to these challenges, participants identified a number of ideas on how and where temporal flexibility in the management process might improve councils' ability to achieve optimum yield, including:

Average or weight stock assessments – Instead of relying solely on the single most recent assessment to inform Acceptable Biological Catch (ABC), a series of assessments could be incorporated with appropriate weighting. This approach may better represent trends in the stock and buffer against dramatic changes in catch targets.

Smooth ABCs in response to new assessments – Incorporating stepwise adjustments of ABCs in response to new assessments could increase stability for stakeholders through phasing in increases and decreases to the ABC over time.

Incorporate carryover provisions – Carryover provisions could allow for a portion of unused quota to be carried over into the next fishing year, or overages to be subtracted from the next year’s quota as part of an adaptive management strategy rather than as an accountability measure. The ability to transfer quota across fishing years would increase stakeholders’ ability to fully utilize quota and provide flexibility to accommodate variability in catch and effort.

Explore multi-year accountability measures – A multi-year average of catch could be compared to a multi-year average of ACLs as the basis for triggering accountability measures. This expanded temporal frame could provide flexibility and allow for variability in annual catches while still adhering to overall catch limits.

Utilize multi-year specifications – While ACLs must be specified for a single year, setting ACLs for multiple years during a single specification process may increase stability for stakeholders and reduce the administrative burden of annual specification processes. Multi-year specification cycles could potentially employ a constant catch level or fishing mortality rate for particularly stable stocks, or apply progressive uncertainty buffers to account for longer term projections.

Participants acknowledged the tradeoffs associated with applying these approaches and the changes to management structure, FMPs and the National Standard 1 guidelines that might be required for their implementation. In particular, several of the above ideas may require the overfishing definition in the NS1 guidelines to be expanded from its current annual reference to a longer-term approach. Record building and additional legal guidance may also be needed to facilitate the above strategies.

Bycatch and Rebuilding in Multispecies Fisheries

In multispecies fisheries, bycatch of non-target and rebuilding stocks can constrain catch of healthy target stocks. While the Magnuson-Stevens Act instructs councils to minimize bycatch of non-target stocks, stocks within a multispecies complex often overlap spatially and are susceptible to the same gear types. Councils are also required to immediately end overfishing and rebuild overfished stocks. The Act specifies a maximum timeframe of 10 years for rebuilding, or the shortest amount of time possible for stocks that cannot rebuild within 10 years. This often results in significantly reduced ACLs, which can be problematic when the rebuilding stock is encountered as bycatch in healthy targeted fisheries.

During this breakout session, Forum participants discussed the challenges of achieving optimum yield for targeted stocks given bycatch constraints and allowing for the rebuilding of overfished stocks in multispecies fisheries. These challenges include:

Allocation of bycatch quota – Multiple directed fisheries may encounter the same stock; the stock may be targeted in some fisheries and considered bycatch in others. Allocation of bycatch quota requires managers to make tradeoffs between maximizing value, yield or participation, and balancing social and economic consequences. Allocation questions also highlight the challenge of managing complex systems with single species management.

Equity in rebuilding fisheries – During rebuilding, participation and directed effort in the fishery may change to accommodate reductions in quota. Shifting catch histories make it challenging to ensure equitable allocation of the costs and benefits of rebuilding.

Economic consequences of “choke” stocks – Insufficient quota for bycatch and rebuilding stocks may severely constrain the prosecution of healthy, economically important fisheries. Particularly in the case of ‘lightening strike’ bycatch events, a single rare bycatch interaction can result in closure of the targeted fishery and significant financial losses.

Lack of rebuilding success – Despite adherence to rebuilding plans, some overfished stocks are not rebuilding within the anticipated time frame, and continue to constrain catch of healthy stocks. There is a further possibility that overfished stocks may never rebuild to target levels, whether due to conditions of the stock such as a loss of reproductive capacity, or external factors such as climate change.

Incentives and optimization – While there are multiple approaches for limiting fishing mortality of non-target and rebuilding stocks, such as prohibiting possession, requiring full retention and applying bycatch mortality estimates; each can have disadvantages and influence profitability, utilization and fishing behavior, sometimes creating incentives counter to the conservation objective.

The group generated several ideas that may help managers in addressing the above challenges including:

Explore gear modifications – Increasing selectivity of fishing gear could help to reduce bycatch of non-target and rebuilding stocks.

Increase flexibility in annual bycatch limits – Particularly for fisheries where bycatch is infrequent but substantial, a multi year approach that incorporates flexibility around annual bycatch limits would promote better utilization of the targeted fishery.

Utilize market mechanisms – Market mechanisms may promote efficient use of limited bycatch quota to maximize overall yield and/or economic value.

Recalibrate B_{MSY} – To incorporate ecosystem and climate change considerations into rebuilding, revisiting B_{MSY} benchmarks may be useful to inform expectations for rebuilding timelines. Updated B_{MSY} reference points would also inform appropriate status determination criteria against which rebuilding success is measured.

Encourage cooperative approaches – Fishery cooperatives or risk pools may provide insulation from individual risk exposure resulting from a large bycatch event. These cooperative approaches would encourage broader utilization of bycatch-constrained fisheries.

Spatially manage bycatch interactions – Identifying areas of high bycatch occurrence and instituting in-season or responsive area closures may help fishery participants and managers to utilize larger portions of targeted fishery quota within the constraints of limited bycatch quota.

Central to the discussion of challenges and potential solutions were the tradeoffs inherent in managing multispecies fisheries. Forum participants acknowledged that the perception of costs and benefits when making tradeoff decisions are informed by each individual's underlying values. While many of the ideas listed above involve the application of tools already available to councils and stakeholders, some of the ideas may require revisions to the NS1 guidelines and additional guidance.

Data Limited Fisheries and Catch Targets

Many councils manage data poor stocks and are challenged to derive meaningful catch targets and comply with the ACL requirement. In addition to limitations in biological data, managers often lack the social, economic and ecological information necessary to incorporate more nuanced objectives into their management of data poor stocks. During this breakout session, Forum participants discussed the impediments and opportunities for moving toward optimum yield in data limited fisheries.

Forum participants identified several areas where the lack of data for many stocks constrains the potential for achieving optimum yield, including:

Lack of economic and social data – Data poor fisheries often lack the social and economic information necessary to support the full evaluation of management alternatives, particularly within the context of allocation and optimum yield. The small-scale nature of many data poor fisheries also poses challenges of confidentiality in the collection and utilization of socioeconomic data.

Tradeoffs in scale of management – The management of data poor stocks highlights the tradeoffs between managing at the species versus complex level. Without sufficient data to set ACLs for a specific species or stock, many councils aggregate similar stocks and specify ACLs at the complex level. This grouping of stocks can have significant consequences should the catch of a single species trigger accountability measures across the entire complex.

Data poor implications under risk policies – In applying risk policies to specify ACLs, lack of data is often equated with high uncertainty, triggering precautionary management and conservative ACLs. Many data poor stocks are targeted in small scale and subsistence fisheries, and the potential forgone yield associated with a conservative catch limit comes at a cost to these communities.

Reflections of value – Many data poor stocks lack information as a result of their perceived and/or relative value and therefore receive low priority in the allocation of stock assessment resources. These data and value discrepancies complicate tradeoff

decisions and optimum yield discussions, particularly when high value fisheries are constrained by data poor stocks.

Gaps in scientific capacity – The large number of data poor stocks highlights misalignment between the data intensive management system of specifying annual catch limits for all stocks, and our scientific capacity to produce stock assessments.

In response to these challenges, Forum participants contemplated how Councils might extend the discussion of optimum yield to data poor stocks and identified several potential pathways to better position councils in managing data poor stocks toward this objective.

Improve data availability – Although increased data does not necessarily translate into decreased uncertainty, cooperative research, creative data collection approaches, and utilization of research set-asides could improve data availability.

Incorporate and utilize a triage approach – Optimum yield considerations and increased input from stakeholders can be used to prioritize limited data collection resources in a way that provides the biggest return.

Classify Ecosystem Component (EC) species – The designation of EC species has not been used to its full extent due to questions of legal precedent and the need for additional guidance. Revisiting the requirements for EC species, allowing for a continuum of designations, and providing additional guidance would help councils to focus their management efforts on active fisheries.

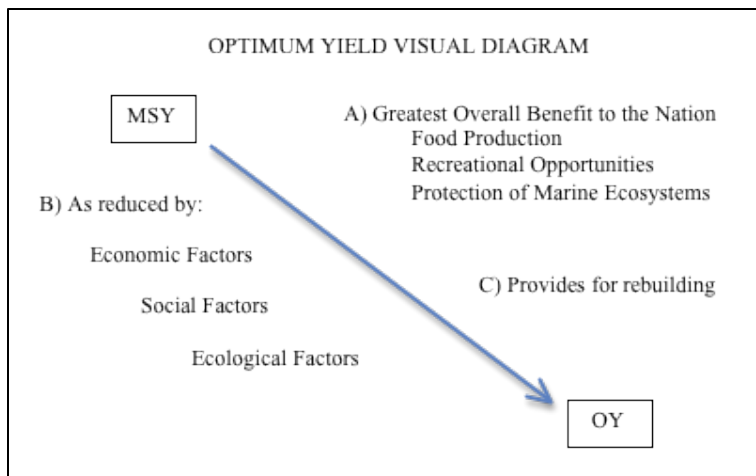
Re-think the scale of optimum yield – Optimum yield is conceptualized through its relationship to MSY, which is not a compatible reference point for many data poor stocks. De-coupling the concept of optimum yield from MSY may provide better guidance for the management of data poor stocks. Optimum yield may be better applied in relation to trophic level function, ecosystem resilience and on a spatial or regional scale.

Communicate and coordinate – Improved communication and coordination between councils, SSCs and advisory bodies can help advance discussions of risk policy and optimum yield for data poor stocks. The incorporation of a ‘council/SSC liaison’ position could foster collaboration and strategically maximize the value of the council-science interface.

These discussions highlighted several steps that councils and their management partners could take to improve the management process and encourage better data availability under the current management framework. Participants suggested that councils would benefit from additional guidance regarding the classification of EC species, as well as clarification regarding the appropriate scale for optimum yield within the context of data poor stocks.

Tools Training: Getting to 'optimum'

The mandate to achieve optimum yield from US fisheries is a complex and multi-faceted directive. This concept of 'optimum' is defined under the Magnuson-Stevens Act by its relationship to a number of different considerations. Determining optimum yield for a single stock or multispecies fishery involves balancing multiple objectives and making decisions that involve significant tradeoffs. This



portion of the Forum agenda provided participants with the opportunity to explore the application of tradeoff analysis and structured decision making as tools to support councils in managing toward optimum yield.

Tradeoff Analysis

Dr. Ben Halpern [PDF](#) [Video](#)
Director, Center for Marine Assessment and Planning (CMAP), University of California Santa Barbara

Dr. Halpern presented the concept and application of tradeoff analysis as a tool that can be used to identify tradeoffs and characterize relationships between multiple objectives. Historically used in the field of economics, tradeoff analysis is an emerging tool in marine resource management. In the context of optimum yield, tradeoff analysis can support the council process through:

- a) Mapping potential outcomes across multiple objectives to identify tradeoffs between different management options, and
- b) Characterizing the relationship between objectives and identifying the 'efficiency frontier' to inform the development of management options that provide maximum benefit across objectives.

Tradeoff analysis is not a prescriptive tool; rather, it guides informed decision making through identifying where tradeoffs exist and requiring that these tradeoff decisions be explicit.

Structured Decision Making

Graham Long [PDF](#) [Video](#)
Partner, Compass Resource Management, Ltd.

Mr. Long presented structured decision making as a systematic and transparent approach for incorporating multiple tradeoffs and balancing competing objectives in decision making processes. Structured decision making is a way to translate our

individual, internal decision processes into a collective, explicit decision process. This tool can take many different forms and is designed to reflect the objectives, alternatives and values around a particular decision. Structured decision making can help councils make tradeoff decisions through step-by-step consideration of how different management alternatives achieve differing management objectives, and the relative value of those management objectives. This process encourages participation, makes value judgments and tradeoff decisions explicit, and can be used to document and communicate the decision process.

Forum wrap-up

To conclude the Forum, participants reflected on the presentations and discussions over the last two days and engaged with their colleagues in sharing ideas for advancing discussions around optimum yield. Three of the major themes from this discussion are captured below:

Reflections on the future of optimum yield

Until recently, much of the discussion around National Standard 1 has been focused on the implementation of ACLs; the exploration of where and how optimum yield guides fisheries management is perhaps the second stage of this conversation. In contemplating how the objective of optimum yield might evolve, participants suggested that optimum yield might be most useful as a living, evolving strategic vision that spans the entire management process rather than as a formula or rigidly operationalized benchmark. As each council has a different vision and context for optimum yield, defining and identifying pathways for achieving optimum yield may be better addressed at the council level rather than on a broad national scale.

Making the implicit explicit

While optimum yield is not explicitly prominent within council discussions, optimum yield is inherent in the council process and serves as a foundation for council decisions. Several participants noted that this internalization of optimum yield highlights the need for councils to better communicate with their stakeholders and make explicit the usually implicit role of optimum yield and the vision it represents. By clearly articulating objectives, values and tradeoffs, councils can both improve communication with stakeholders and increase transparency. Forum participants expressed interest in exploring the use of structured decision making as a tool for framing and documenting optimum yield discussions, and building the administrative record to support their decisions.

Collective Momentum

As participants reflected on the Forum's discussions and together considered the pathways forward, a collective momentum was evident among the group. Participants expressed interest in incorporating new tools, continuing these discussions with their councils and working to more clearly articulate their council's vision of optimum yield. In addition to the more concrete ideas on translating ideas into actions, the group expressed enthusiasm for engaging with their colleagues and working together to maximize the value and utility of optimum yield within the context of National Standard 1.