

Governance of Adaptive Management

Information Sheet



Delta
Science
Program

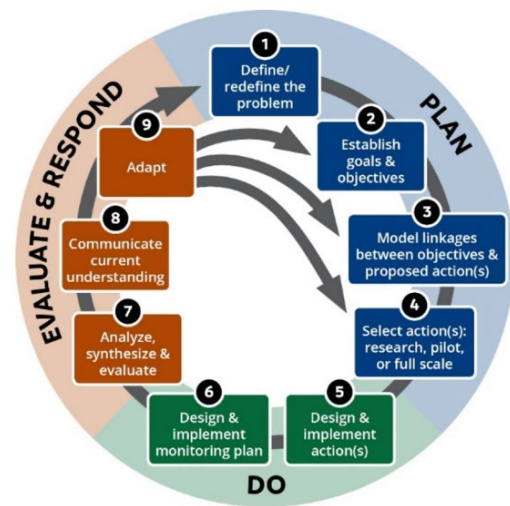
DELTA STEWARDSHIP COUNCIL

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- Adaptive management is a science-based, structured approach to improving understanding of the problems and uncertainties of environmental management.
- It supports, and is supported by, complex governance systems, including diverse structures, processes, and rules for managing natural resources.
- Adaptive governance occurs when governance systems can facilitate ongoing and regular interactions between vested actors and organizations.
- The Delta Science Program provides the best available science to promote decision-making in the Delta. This includes scientifically supporting other agencies and organizations that are planning and implementing adaptive management.

Background and key terms

Adaptive management (AM) is defined in the Delta Reform Act as a framework and flexible decision-making process for ongoing knowledge acquisition, monitoring, and evaluation leading to continuous improvements in management planning (Wat. Code, § 85052 et seq.). AM of social-ecological systems is often described as a science-based process of project implementation that informs decision-making. Three stages – *plan*, *do*, and *evaluate and respond* – iteratively guide AM in the Delta. Successful AM needs to both support and contribute to the broader social and “governance” contexts it is applied in.¹



¹ Steelman, T. (2022). Adaptive governance. *Handbook on Theories of Governance*, 580–591.



Governance of social-ecological systems includes the *structures* (e.g., governmental and non-governmental actors, organizations, forums); *processes* (e.g., participant interactions, decision-making); and *laws, policies, and rules* for managing ecosystems and natural resources. Governance systems can be inflexible, but they can also be adaptive.

Adaptive governance often emerges when governance systems facilitate ongoing and regular interactions between vested actors and organizations.^{2,3} It is about building capacity within a governance system for learning and change. When governance systems are adaptive, they support the implementation and success of AM programs. Additionally, AM programs can provide critical sources of information, tools, and resources to support learning and collaboration that are needed for effective adaptive governance.

To support adaptive processes, coordination is used to minimize knowledge and information fragmentation and can facilitate the alignment of diverse perspectives and interests toward a common goal.⁴ For example, the Delta science enterprise is a collection of science forums that develop, synthesize, and communicate scientific knowledge for AM across sectorial and organizational boundaries.⁵

² Folke, C., Hahn, T., Olsson, P., & Norberg, J. (2005). Adaptive Governance of Social-Ecological Systems. *Annual Review of Environment and Resources*, 30(1), 441–473. <https://doi.org/10.1146/annurev.energy.30.050504.144511>

³ Chaffin, B. C., Gosnell, H., & Cosens, B. A. (2014). A decade of adaptive governance scholarship: Synthesis and future directions. *Ecology and Society*, 19(3). <https://www.jstor.org/stable/26269646>

⁴ Calanni, J. C., Siddiki, S. N., Weible, C. M., & Leach, W. D. (2015). Explaining Coordination in Collaborative Partnerships and Clarifying the Scope of the Belief Homophily Hypothesis. *Journal of Public Administration Research and Theory*, 25(3), 901–927. <https://doi.org/10.1093/jopart/mut080>

⁵ Wiens, J.A., Zedler, J.B., Resh, V.H., Collier, T.K., Brandt, S. Norgaard, R.B., Lund, J.R., Atwater, B., Canuel, E., and H.J. Fernando. 2017. “Facilitating Adaptive Management in California’s Sacramento–San Joaquin Delta.” *San Francisco Estuary and Watershed Science* 15(2). https://doi.org/10.15447/sfews.2017v15iss2art3_

Governance features supporting effective adaptive management and governance

AM programs can experience challenges moving beyond the planning phase. The Delta Plan acknowledges several barriers to AM⁶ such as lack of secure funding and staffing, limited stakeholder buy-in, and rigid permitting requirements, among other challenges. For both AM and adaptive governance to be effective, the network of individuals, organizations, and collaborative forums need certain governance features,^{7,8,9} such as:

Leadership: Individuals and organizations who are skilled at facilitation, fostering organizational and institutional learning, and stakeholder engagement can support AM and adaptive governance.⁹ For example, the [Integrated Modeling Steering Committee](#), a collaborative forum that provides leadership on modeling tools for AM, held an [Integrated Modeling Framework Workshop](#) to work towards a modeling center for the Delta that integrates science, data, and models.¹⁰

Trust Building: AM can be a socially and politically tenuous process given the potential legal and institutional barriers individuals may face in implementing policies that address desired social and ecological outcomes.^{11,12} Trust facilitates collective action, which is an integral part of institutions' and programs' ability to adapt and change. Trust can be built through repeated interactions among individuals engaged in the AM program.¹³

⁶ Delta Stewardship Council. (2013). *Appendix C – Adaptive Management and the Delta Plan*. <https://deltacouncil.ca.gov/pdf/delta-plan/2013-appendix-c-adaptive-management.pdf>

⁷ Heikkila, T., & Gerlak, A. K. (2013). Building a Conceptual Approach to Collective Learning: Lessons for Public Policy Scholars. *Policy Studies Journal*, 41(3), 484–512. <https://doi.org/10.1111/psj.12026>

⁸ Levesque, V. R., Calhoun, A. J. K., Bell, K. P., & Johnson, T. R. (2017). Turning Contention into Collaboration: Engaging Power, Trust, and Learning in Collaborative Networks. *Society & Natural Resources*, 30(2), 245–260. <https://doi.org/10.1080/08941920.2016.1180726>

⁹ Lubell, M., Pozzi, T., Heikkila, T., & Gerlak, A. (2023). Policy Learning for Adaptive Management in the California Delta. In prep.

¹⁰ Integrated Modeling Steering Committee (2023). *Integrated Modeling Framework Workshop*. <https://deltacouncil.ca.gov/pdf/science-program/information-sheets/2023-02-10-integrated-modeling-framework-workshop-information-sheet.pdf>

¹¹ cfin, B. C., Gosnell, H., & Cosens, B. A. (2014). A decade of adaptive governance scholarship: Synthesis and future directions. *Ecology and Society*, 19(3). <https://www.jstor.org/stable/26269646>

¹² Olsson, L., Jerneck, A., Thoren, H., Persson, J., & O'Byrne, D. (2015). Why resilience is unappealing to social science: Theoretical and empirical investigations of the scientific use of resilience. *Science Advances*, 1(4), e1400217. <https://doi.org/10.1126/sciadv.1400217>

¹³ Adger, W. N. (2010). Social Capital, Collective Action, and Adaptation to Climate Change. *Der Klimawandel*, 327–345. https://doi.org/10.1007/978-3-531-92258-4_19



Representative engagement: The inclusion of networks and multiple centers of authority bring in meaningful ways to engage diverse perspectives and build the legitimacy of AM decision-making.^{14,15} Representative engagement can be supported through fair decision-making processes and conflict assessment and resolution mechanisms. For example, the Franks Tract Futures¹⁶ project used a transparent and collaborative structured decision-making process to develop a habitat enhancement plan.

¹⁴ Berardo, R., & Lubell, M. (2019). The Ecology of Games as a Theory of Polycentricity: Recent Advances and Future Challenges. *Policy Studies Journal*, 47(1), 6–26. <https://doi.org/10.1111/psj.12313>

¹⁵ Dietz, T., Ostrom, E., & Stern, P. C. (2003). The Struggle to Govern the Commons. *Tragedy of the Commons*.

¹⁶ California Department of Fish and Wildlife (2018). *Franks Tract Futures?* <https://franks-tract-futures-ucdavis.hub.arcgis.com/>

Some example components of the governance system of AM in the Delta include, but are not limited to, the following:

1. The governance structure for AM:

- I. *Individuals:* Planners, managers, funders, scientists, administrators, regulators, farmers, decision-makers, community members, students.
- II. *Organizations:* Federal agencies, State agencies, regional agencies, local governments, Tribal governments, community-based organizations, non-governmental organizations, private industry, and academia.
- III. *Collaborative forums:* Collaborative Science and Adaptive Management Program, Collaborative Adaptive Management Team, Suisun Adaptive Management Advisory Team, Interagency Implementation and Coordination Group, Interagency Ecological Program, Interagency Adaptive Management Integration Team, Delta Plan Interagency Implementation Committee.

2. Processes to support AM:

- I. Formal meetings by various organizations and forums involved in the governance structure.
- II. Online resource hubs with data, frameworks, case studies, conceptual models, and quantitative models related to AM (e.g., Interagency Adaptive Management Coordination resource list, Delta Conservation Adaptive Management Cal-Adapt, Adaptation Clearinghouse, Delta Science Tracker).
- III. Engagement opportunities (e.g., design concept survey for Franks Tract Futures).
- IV. Educational workshops (e.g., Adaptive Management Forum, Delta Science Program Webinar series).
- V. Networking opportunities.
- VI. Technical support (e.g., IAMIT expert consultation).
- VII. Funding opportunities.

3. Laws, policies, and rules:

- I. The Sacramento – San Joaquin Delta Reform Act of 2009 (CA Wat. Code, § 85000 et seq.) provides the basis for the governance of AM in the Delta¹⁷ and required that the Delta Stewardship Council adopt and implement the Delta Plan.
 - a. The legislation established that the Delta Plan meet all of the following requirements:¹⁸
 - i. Be based on the best available scientific information and independent science advice provided by the Delta Independent Science Board.
 - ii. Include quantified or other measurable targets associated with achieving the objectives of the Delta Plan.
 - iii. Where appropriate, utilize monitoring, data collection, and analysis of actions sufficient to determine progress toward meeting the quantified targets.
 - iv. Describe the methods by which the Council shall measure progress toward achieving the coequal goals.
 - v. Where appropriate, recommend integration of scientific and monitoring results into ongoing Delta water management.
 - vi. Include a science-based, transparent, and formal AM strategy for ongoing ecosystem restoration and water management decisions.
 - b. The legislation established the Delta Science Program’s mission to provide the best possible unbiased scientific information to inform water and environmental decision-making in the Delta, promote science-based AM and assist with development and updates of the Delta Plan.¹⁹
 - c. The Delta Plan²⁰ recommends governance to support learning and collaboration among decision-making authorities in the Delta.
- II. Permitting for AM is implemented by several state and federal agencies in the Delta informed by various legislative acts such as federal Endangered Species Act of 1973 (16 U.S.C. § 1531 et seq.), California Endangered Species Act (Fish & G. Code, § 2050 et seq.), and California Environmental Quality Act (Pub. Resources Code, § 21000 et seq.).

¹⁷ Sacramento – San Joaquin Delta Reform Act of 2009, CA Wat. Code § 85000 et seq. (2009).

https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200920107SB1&search_keywords

¹⁸ Sacramento – San Joaquin Delta Reform Act of 2009, CA Wat. Code § 85308 et seq. (2009).

https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=WAT§ionNum=85308.

¹⁹ Sacramento – San Joaquin Delta Reform Act of 2009, CA Wat. Code § 85280(b)(4). (2009).

https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200920107SB1&search_keywords

²⁰ The Delta Plan. (Amended 2019). <https://www.deltacouncil.ca.gov/pdf/delta-plan/2019-01-02-amended-chapter-2.pdf>

Where can I find more information?

You can find additional information about AM in the Delta on the [AM web page](https://deltacouncil.ca.gov/delta-science-program/adaptive-management) (deltacouncil.ca.gov/delta-science-program/adaptive-management), including resources and opportunities for engagement and coordination. Please email us at adaptivemanagement@deltacouncil.ca.gov with any questions.

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