

HENRY

Hydraulic Engineering Repository

Ein Service der Bundesanstalt für Wasserbau

Conference Paper, Published Version

Jay Lund

Can Adaptive Management for the Sacramento-San Joaquin Delta be more than Words?

Zur Verfügung gestellt in Kooperation mit/Provided in Cooperation with:
Kuratorium für Forschung im Küsteningenieurwesen (KFKI)

Verfügbar unter/Available at: <https://hdl.handle.net/20.500.11970/109765>

Vorgeschlagene Zitierweise/Suggested citation:

Jay Lund (2012): Can Adaptive Management for the Sacramento-San Joaquin Delta be more than Words?. In: Hagen, S.; Chopra, M.; Madani, K.; Medeiros, S.; Wang, D. (Hg.): ICHE 2012. Proceedings of the 10th International Conference on Hydroscience & Engineering, November 4-8, 2012, Orlando, USA.

Standardnutzungsbedingungen/Terms of Use:

Die Dokumente in HENRY stehen unter der Creative Commons Lizenz CC BY 4.0, sofern keine abweichenden Nutzungsbedingungen getroffen wurden. Damit ist sowohl die kommerzielle Nutzung als auch das Teilen, die Weiterbearbeitung und Speicherung erlaubt. Das Verwenden und das Bearbeiten stehen unter der Bedingung der Namensnennung. Im Einzelfall kann eine restriktivere Lizenz gelten; dann gelten abweichend von den obigen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Documents in HENRY are made available under the Creative Commons License CC BY 4.0, if no other license is applicable. Under CC BY 4.0 commercial use and sharing, remixing, transforming, and building upon the material of the work is permitted. In some cases a different, more restrictive license may apply; if applicable the terms of the restrictive license will be binding.



CAN ADAPTIVE MANAGEMENT FOR THE SACRAMENTO-SAN JOAQUIN DELTA BE MORE THAN WORDS?

Jay Lund¹

“Adaptive management” is an almost unavoidable term in contemporary environmental planning, management, and policy. It is almost impossible to have a major environmental planning or policy effort which does not refer to or require it. Although rhetorical consensus on the desirability of adaptive management seems frequently achieved, implementation experience has been more varied and faces important impediments. This has spawned numerous learned papers and reports on the success, prospects, and pitfalls of adaptive management (Doremus et al. 2011; Stankey et al. 2005; Lee 1999; Walters 1997).

Adaptive management seems to have taken on many practical meanings which differ from the original approach suggested by C.S. Holling (1978). These are summarized in Table 1. Here, the top-most approach seems closest to the original, and perhaps the most difficult to implement, while the latter approaches are perhaps the most common and politically effective, but have dubious environmental management effectiveness. Many authors note the practical, institutional, and political challenges for adaptive management.

Table 1: Schools of Thought in Adaptive Management

| | |
|------------------------------------------------|--------------------------------|
| Model, manage, and revise | Holling (1978); Walters (1986) |
| Experimental management | Lee (1993), Grand Canyon |
| Real-time management | VAMP |
| Manage and revise reactively (trial and error) | |
| Manage and promise to fix later | |
| Just keep saying adaptive management | |

To be environmentally effective, adaptive management must learn faster (hopefully much faster) than the ecosystem deteriorates, relative to some management objective. Consider an ecosystem with 100 significant uncertainties, of which somehow only 10 are critical to resolve before the system can be managed to recover; we don’t know which of the 100 uncertainties are critical. Given a rate at which uncertainties are resolved, in some sense, how long will it likely take for understanding to advance enough for ecosystem management to become effective? Figure 1 illustrates this for two rates of learning, where 5 random uncertainties are resolved each year (dashed line) and where 2 uncertainties are resolved each year (solid line). Fairly high rates of learning are likely to be needed for adaptive management to be successful, with institutional, financial, and management implications.

¹ Professor, Department of Civil and Environmental Engineering, University of California – Davis, Davis, CA 95616, USA (jrlund@ucdavis.edu)

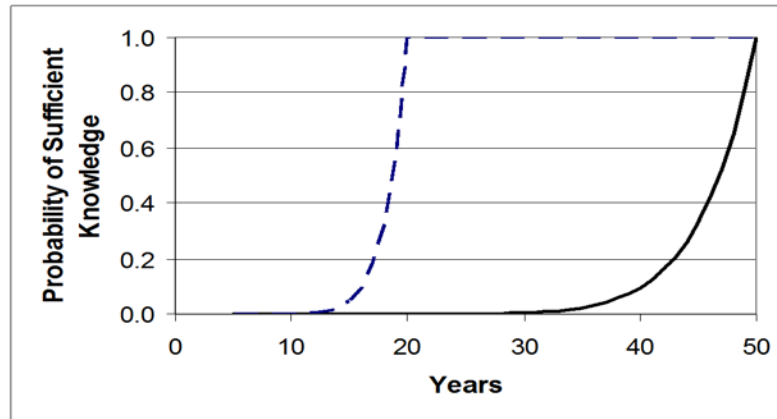


Figure 1 Years required for 10 critical uncertainties to be resolved from 100 significant uncertainties to allow ecosystem management to become effective with learning rates of 5/year (dashed line) and 2/year (solid line)

California’s Sacramento-San Joaquin Delta is a diked and drained former tidal marshland of roughly 200,000 ha which also is a major source of urban and agricultural water supply. The Delta’s ecosystem includes a growing list of threatened and endangered species under federal and state legislation, as well as a growing number of invasive species and growing controversies over water and land management (Lund et al. 2010). Hundreds of federal, state, and local agencies are involved, as well as numerous non-governmental organizations and private stakeholders. At any time several planning processes are ongoing, some small and focused, and others larger and more comprehensive. All are controversial. Many invoke “adaptive management”. The development of an ecologically effective adaptive management program is technically, scientifically, institutionally, and politically difficult under these circumstances. But there seems little alternative.

Some ideas are suggested which seem promising for developing an effective adaptive management program under these challenging conditions. Perfection is unlikely to be an option. The rapid learning needed for adaptive management will challenge both bureaucratic and scientific cultures; mistakes from both perspectives will be made. Mistakes are important for learning.

REFERENCES

- Doremus et al. (2011), “Making good use of adaptive management,” Center for Progressive reform.
- Johnson, B. L. 1999. Introduction to the special feature: adaptive management - scientifically sound, socially challenged? *Conservation Ecology* 3(1): 10. URL: <http://www.consecol.org/vol3/iss1/art10/>
- Lee, K. N. 1999. Appraising adaptive management. *Conservation Ecology* 3(2): 3. URL: <http://www.consecol.org/vol3/iss2/art3/>
- Lee, K. N. 1993. *Compass and Gyroscope. Integrating science and politics for the environment.* Island Press, Washington, D.C.
- Lund, J., E. Hanak, W. Fleenor, W. Bennett, R. Howitt, J. Mount, and P. Moyle, *Comparing Futures for the Sacramento-San Joaquin Delta*, University of California Press, Berkeley, CA, February 2010.
- Walters, C. 1997. Challenges in adaptive management of riparian and coastal ecosystems. *Conservation Ecology* 1(2):1. URL: <http://www.consecol.org/vol1/iss2/art1/>
- Walters, C. 1986. *Adaptive Management of Renewable Resources.* Macmillan, New York.