

An Examination of the Hydropower Licensing and Federal Authorization Process

A WPTO R&D Deep Dive Webinar

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Welcome!

WPTO R&D Deep Dive Webinar Series

A look into the ongoing work of WPTO sponsored projects and program areas

Upcoming R&D Deep Dive Webinar Topics:

- **Environmental Decision Support (EDS): Science-Based Tools for Hydropower Stakeholder Collaboration**
- **Fish Protection Prize**

Other WPTO Webinars Coming Soon

- **WPTO SBIR/STTR Topics Webinar – FY22 Phase I Release 2**
 - December 7, 2021, 11:30 a.m. – 1 p.m.
- **Semiannual Stakeholder Webinar**
 - February 2022

Welcome!

- This webinar will be recorded and made available to registrants.
- Attendees' microphones are muted and attendees are not visible on video.
- Questions will be answered during the Q&A after the presentation has ended.
- To ask questions:
 - Submit question into the Chat Box
 - If you have technical issues, try calling into the webinar via phone.
- Thank you for participating!

A close-up, artistic photograph of a waterfall, showing the water cascading down in a series of thin, parallel streams. The water is a deep blue color, and the lighting creates a shimmering effect on the surface. The waterfall is the central focus of the image, with the water flowing from the top right towards the bottom left.

Hydropower Licensing and Federal Authorization Project Overview

Project Overview: Problem Statement/Scope

Problem Statement:

The cost, time, risk and benefits associated with hydropower regulatory processes, or the preparation (e.g., studies) required for regulatory agency review are not well documented and synthesized in the public domain and the impact on hydropower deployment is relatively unknown.

Scope:

- Historical review of hydropower licensing and regulatory approvals, including the role of statutes and regulations outside of the Federal Power Act (e.g., Clean Water Act, Endangered Species Act, Rivers and Harbors Act, National Historic Preservation Act, etc.).
- Quantitative data on project regulatory timelines and costs.
- Qualitative data on stakeholder perspectives.
- **This project is retrospective in nature and is not looking to create or suggest new statutes, regulations or policies.**

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Hydropower Licensing and Federal Authorization Report Outline

Report Outline

Report Outline:

- I. Introduction/Background Chapter
- II. Literature and Policy Review Chapter (+ Appendix A)
 - I. U.S. Hydropower Roles and Responsibilities Matrix
 - Hydropower International Comparison
 - Hydropower Industry/Infrastructure Comparison
- III. Statistical Analysis Chapter (+ Appendix B, C)
- IV. Licensing Cost Chapter (+ Appendix B)
- V. Environmental Measures from Hydropower Licenses Chapter (+ Appendix D)
- VI. Qualitative Stakeholder Perspectives Chapter
- VII. Comparison to Previous Licensing Reports (+ Appendix E)
- VIII. Discussion/Conclusion Chapter

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Report Findings

Regulatory Overview (Chapter 2)

Chapter 2 Provides:

- A comprehensive overview of the hydropower licensing and federal authorization process, including the jurisdictional roles of federal, state, and tribal agencies under federal law.
- A comparison of the U.S. hydropower regulatory framework and other types of energy and water infrastructure in the United States, and other top hydropower-producing countries: Canada, Norway, and Sweden.

Chapter 2 Key Findings:

- All infrastructure project types reviewed in the United States and in other western countries aim to protect the same resource concerns and potential impacts (e.g., water quality, species, cultural resources, recreation).
- United States hydropower licensing involves more agencies and stakeholder engagement requirements than other types of infrastructure in the United States or hydropower projects in other western countries.

Regulatory Overview (Chapter 2)

Agency	FPA 4(e)	FPA 10(a)	FPA 10(j)	FPA 18	NEPA: Lead Agency	NEPA: Coop Agency	ESA Sec. 7	WSRA Sec. 7	CWA 401/402	CWA 404	CZMA	NHPA 106	RHA Sec. 14	TSPDA (LOPP)	Land Access*	Other Species Acts**
BIA	●	●				●									○	
BLM	○	●				●		○							○	
BOR	○	●			●	●								○		
DOD															○	
EPA									○	○						
FWS	○	●	●	○		●	●	○							○	○
USFS	○	●				●		○							○	
NOAA		●	●	○		●	●									○
NPS	○	●				●		○							○	
USACE	○	●			●	●				●			●			
Indian Tribes		●							○			●				
State Agencies		●	●						○		●	●				
FERC	⊙	⊙	⊙	⊙	●		⊙	⊙	⊙	⊙	⊙	⊙	⊙			

Numerous federal and state agencies as well as Indian Tribes play a role in the hydropower licensing and federal authorization process. These roles include providing mandatory license conditions and license recommendations under various provisions of Federal Power Act (FPA) and compliance with federal and state requirements that are preconditions to issuing a hydropower license.

The Federal Energy Regulatory Commission (FERC) must integrate mandatory license conditions and consider license recommendations under the purview of the FPA. Ultimately, FERC is responsible for leading the review under the National Environmental Policy Act and issuing the hydropower license.

- Generally all agencies within one project
- Generally not all agencies within one project
- ⊙ Review, approval and/or integration into license

* Land Access Rights-of-Way, Easements, Leases, and Other Approvals as discussed in section 2.3.5
 ** Biological Resource Considerations and Requirements as discussed in section 2.3.6

Licensing Timeline Statistics (Chapter 3)



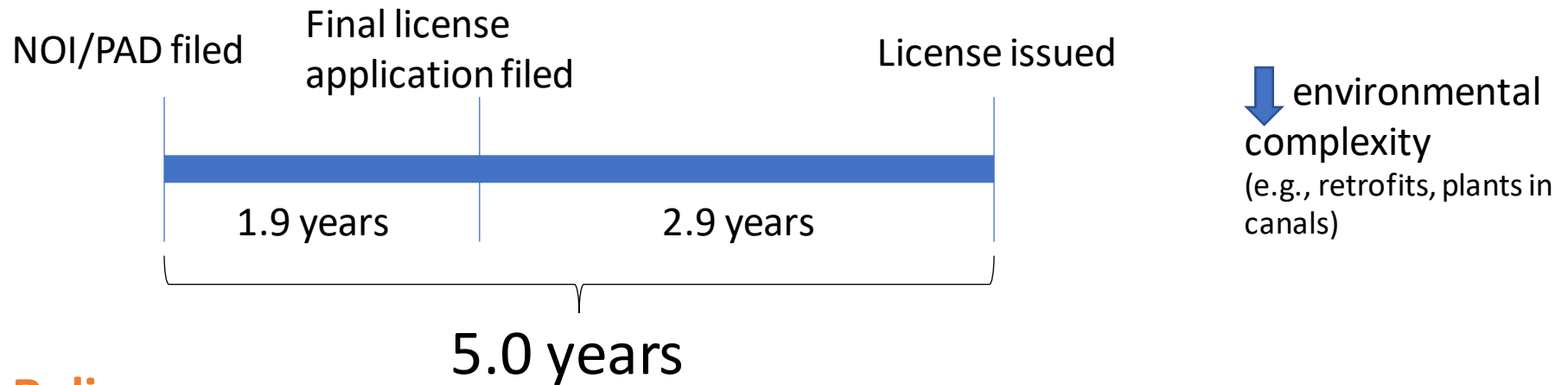
Locations of hydropower plants included in the 107 projects of the dataset

Timeline and Cost Dataset

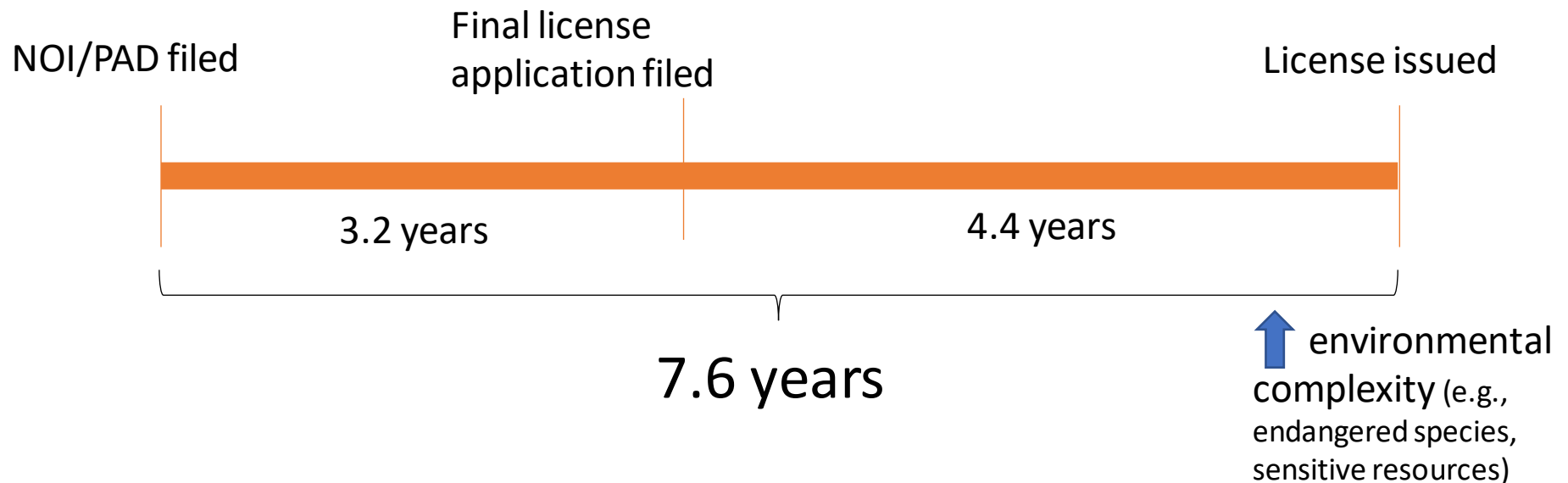
- 107 projects licensed after October 1, 2005 (date ILP enacted)
- Represented 40% of all projects fitting criteria licensed during this time
- Collected information on project and license characteristics, licensing milestone dates,
 - Reported licensing costs (Ch. 4)
- Data available at <https://hydrosource.ornl.gov/>

Licensing Timeline Statistics (Chapter 3)

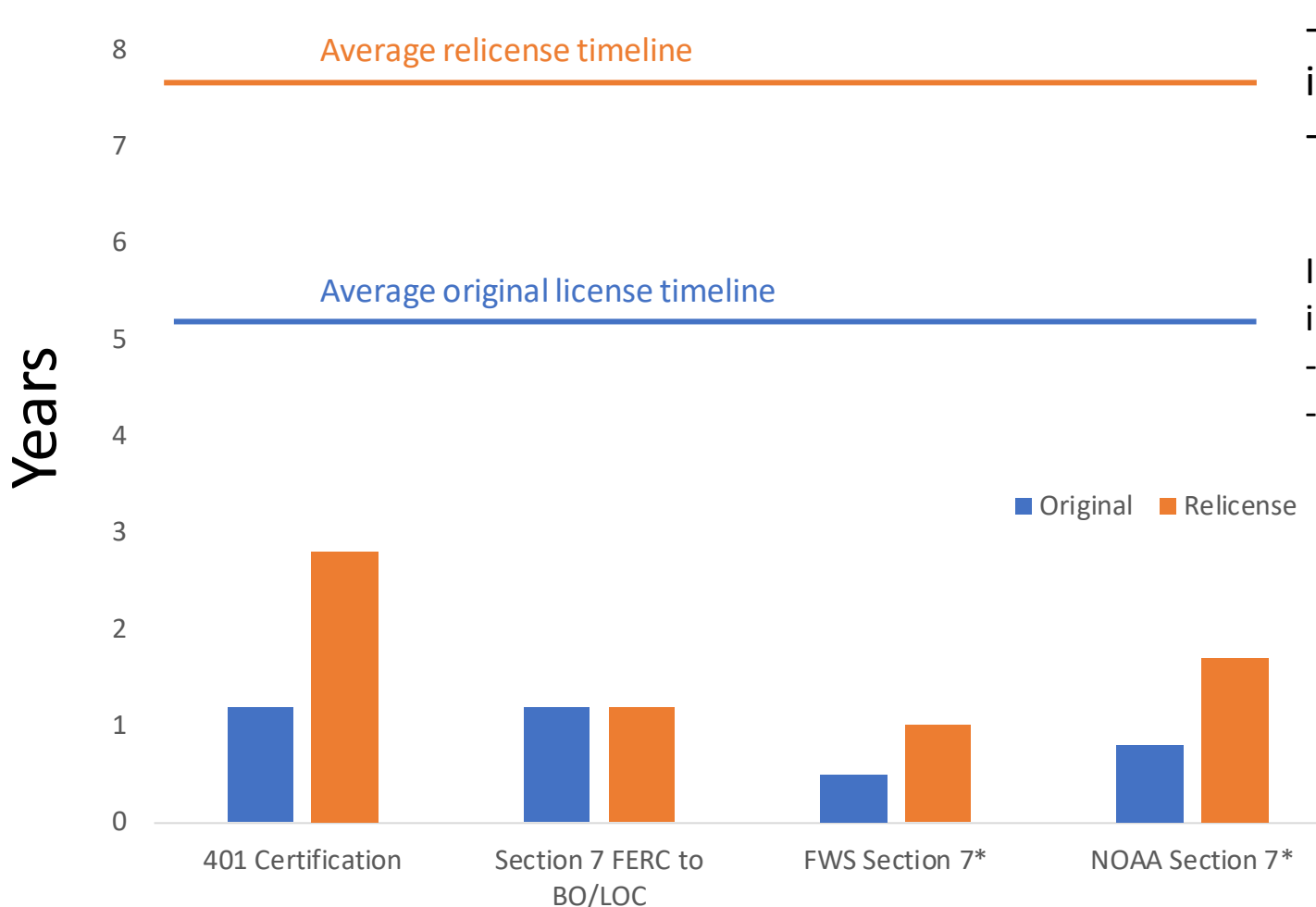
Original License



Relicense



Licensing Timeline Statistics (Chapter 3)



- 73% of 401c waived/
issued in 1 year
- 84% within 2 years

Incomplete Section 7
information adds
- 123 ± 263 days FWS
- 316 ± 395 days NOAA

*For FWS/NOAA, time started date
complete information was received

Licensing Cost Statistics (Chapter 4)

Chapter 4 Provides:

- Data on applicant submitted licensing costs for 82 of the 107 projects in the statistical timeline analysis.
- Comparison of applicant submitted licensing cost data against project attributes also used in the statistical analysis (e.g., license process, license type, size, etc.).

Chapter 4 Key Findings:

- Smaller projects on average had a higher licensing cost under a costs/kilowatt (kW) metric.
- Relicensing had higher reported licensing costs than original licenses.
- Longer timelines are related to higher reported costs for a relicense but there was no relationship between timeline and cost for original licenses.
- Projects using the ALP had the highest mean costs and the highest variability, followed by projects using the ILP and then the TLP.

Licensing Cost Statistics (Chapter 4)

Licensing cost statistics presented in Chapter 4 include:

- Median
- Mean
- Std. Deviation,
- Quartiles,
- Raw costs and
- Cost/kW

Table 10. Results for Subsamples by License Process Type

All four outliers were traditional licensing process (TLP) projects and are excluded from the results. Total N=82.

License Process Type	# of Projects	Metric	Q1	Median	Q3	Mean	Standard Deviation
ALP	9	\$	2,970,000	6,632,000	9,207,000	6,479,000	4,509,000
		kW	24,000	134,000	170,000	106,000	85,000
		\$/kW	69	83	160	341	743
ILP	23	\$	624,000	1,311,000	3,194,000	2,589,000	2,949,000
		kW	3,200	12,000	25,700	60,700	163,000
		\$/kW	64	135	196	342	693
TLP	46	\$	201,000	556,000	1,300,000	1,414,000	2,407,000
		kW	1,800	4,800	14,500	21,500	53,100
		\$/kW	65	95	199	172	199

Table 11. Results for Subsamples by License Type: Original or Relicense

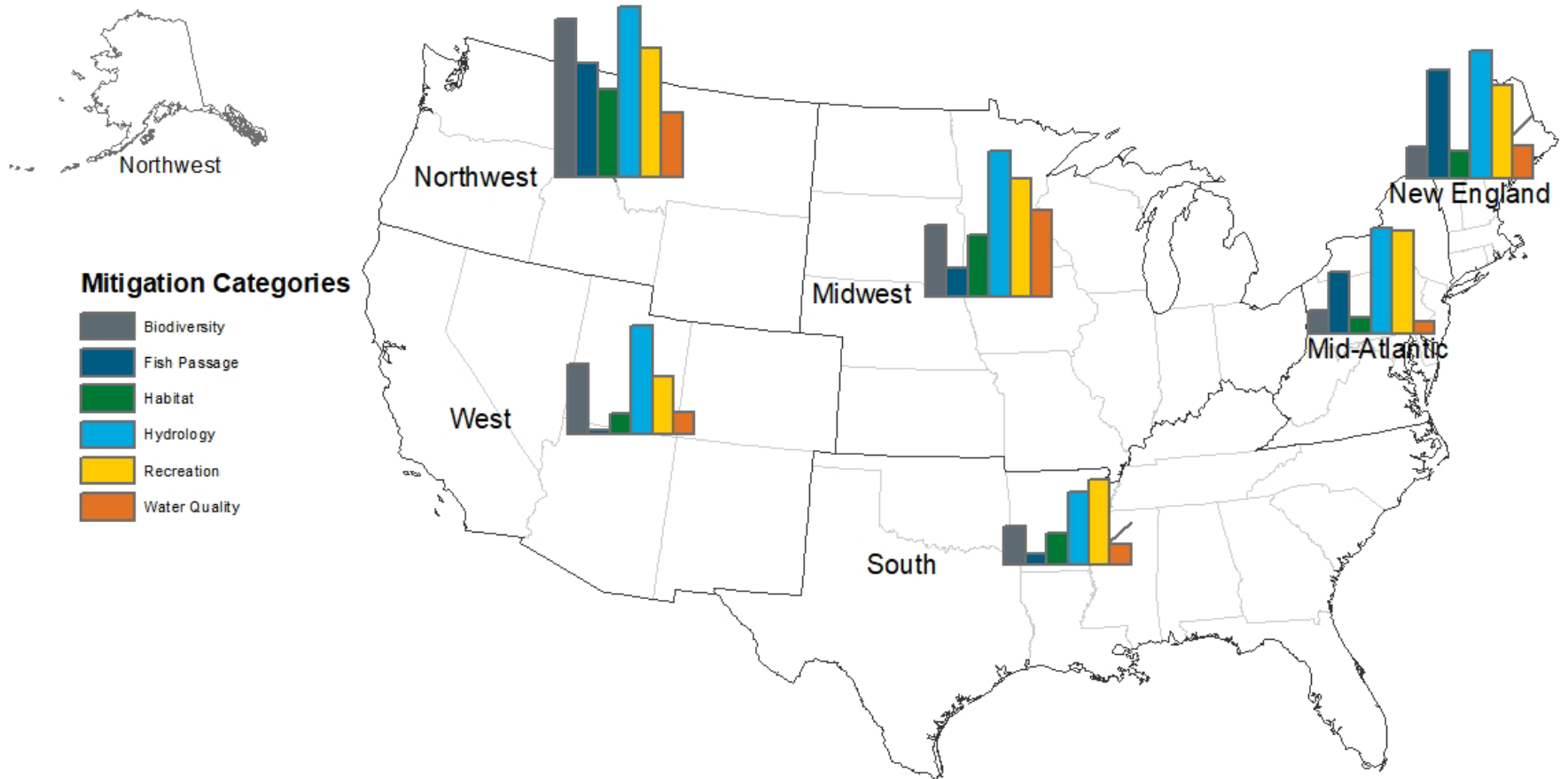
The three high-cost outliers were relicensed projects while the \$/kW outlier was an original project. Outliers are excluded from the results. Total N=82.

License Type	# of Projects	Metric	Q1	Median	Q3	Mean	Standard Deviation
Original	36	\$	346,000	724,000	1,300,000	996,000	952,000
		kW	2,200	5,600	14,200	12,800	19,300
		\$/kW	71	93	157	196	432
Relicense	42	\$	417,000	1,416,000	5,763,000	3,500,000	4,001,000
		kW	1,600	12,500	50,000	68,600	136,000
		\$/kW	56	131	246	281	509

Environmental Measures (Chapter 5)

- Benefits to species
 - Fish passage
 - Species protections
 - Aquatic and terrestrial habitat improvements/protections
 - Water quality
 - Environmental flows most common measure
- Non-ecological resources
 - Includes recreational, cultural, historic resources
 - Second most common type of measure
 - 92% recreational measures
 - Increased access and infrastructure improvements
 - Facilitate public education and resource interpretation

Environmental Measures (Chapter 5)



Stakeholder Perspectives (Chapter 6)

- Interviews and email elicitations of 298 stakeholders and state, federal, and tribal hydropower licensing participants
- Documented perspectives on various components and outcomes of the licensing process
 - License process (ALP vs. ILP vs. TLP)
 - What parts are working well and why?
 - Where is there dissatisfaction?
 - Where are areas of consensus?
 - Where are areas for future collaboration among licensing participants?
- Findings discussed in key takeaways in this webinar

Stakeholders We Contacted (Chapter 6)

Category	Organization	National	Regional						Total
			New England	Mid-Atlantic	South	Midwest	Northwest	West	
Federal	BLM							1	1
Federal	FERC			3	1		1	1	6
Federal	NOAA		4	3	2		9	12	37
Federal	NPS		1		1	2	4	4	12
Federal	USACE	1		3	6		4	1	11
Federal	USFS							18	1
Federal	USFWS					1		6	7
State	401		5	3	3	7	1	16	35
State	Species		6	4	5	10	18	23	66
Environmental and Other NGOs		2	1				2	1	1
Tribes					1		4	1	6
Electric Utilities			1		4	1	15	1	5
Project Development Interests		4	2			6	1		12
									298

Comparison to Other Studies (Chapter 7)

Chapter 7 compares the findings of this report to those of previous studies on hydropower licensing timelines and costs identified during our literature review, including the FERC 603 report, the FERC 2017 Section 6 Report (2-year licensing process), the DOE Hydropower Market Report, and academic literature.

- Both the statistical timeline analysis and the FERC 603 report found the Clean Water Act 401 Water Quality Certification process was a driver of longer hydropower licensing timelines and settlement agreements to be associated with longer licensing timelines.
- The FERC 603 report included criteria not specifically analyzed in this report, including the association between additional information requests, National Historic Preservation Act Section 106 timelines, and timeliness of mandatory conditions from other agencies.



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Key Takeaways

Key Takeaways

1. Length and Complexity of the Licensing Process is Challenging for All Stakeholder Sectors, Including Regulatory Agencies
2. Longer Licensing Timelines Are Associated with Greater Environmental Complexity
3. Licensing Costs Generally Disproportionately Impact Both Smaller Projects and Projects Seeking Original Licenses
4. Environmental Study Negotiations Are a Source of Stakeholder Disagreement in the Licensing Process

Key Takeaways (continued)

5. Incomplete and/or Inadequate Information for Authorization Processes Results in Longer Licensing Timelines and Disagreements Among Some Stakeholders
6. The ILP Had The Shortest and Least Variable Timeline of the Three Licensing Processes.
7. Compared to Other Types of Energy and Water Infrastructure, Both Nationally and Internationally, the U.S. Licensing Process Includes More Federal and State Agencies as well as Opportunities for Stakeholder Engagement
8. Environmental Measures Resulting From The Licensing Process Are Important To Ecosystems and Stakeholders

THANK YOU!



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Supplementary Slides

Project Overview: Goals, Objectives, Outcomes

Overall Project Goals and Objectives:

- Understand the time, cost, benefits, and associated risk and uncertainty of hydropower licensing and regulatory approvals.
- The casual factors behind those issues.
- The impacts on the hydropower market, economics, and future deployment.

Expected Project Outcomes:

- Transparent data and analysis to inform collective discussions by stakeholders regarding the hydropower licensing process (datasets, analysis, publications).
- Identification of federal, state, and tribal roles in hydropower licensing and other relevant regulatory authorizations and how these disparate authorities might overlap.
- Comparison of how hydropower licensing in the United States compares to the permitting of other infrastructure projects as well as hydropower permitting internationally.
- An examination of timelines and uncertainty associated with license renewals, greenfield development, and non-powered dam development.
- Analysis of costs and stakeholder valuation of benefits of the existing process.

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Stakeholder Working Group

Stakeholder Outreach

The project team has conducted multiple outreach efforts with hydropower industry stakeholders, both prior to project initiation and throughout FY19, including:

- Preliminary outreach to federal and state regulators
- Preliminary outreach to hydropower industry stakeholders
- Conference participation (NHA-CA, NWHA, WPW)
- Creation of a project specific stakeholder working group



Stakeholder Working Group: Selection

Selection Process: Stakeholder Identification

- Stakeholder Working Group (SWG) members were identified through a series of discussions held by DOE, NREL, ORNL and Kearns & West.
- The discussions were held with a cross-section of hydropower community stakeholders, including tribes, federal and state agencies, non-governmental organizations, industry and developers.

Selection Process: Stakeholder Selection

Qualifications for selecting members of the SWG include the following:

- Should bring knowledge of the organization and the interests that they represent;
- Have direct hydropower experience, and
- Be committed to representing their interests and considering the other diverse interests involved in hydropower.

Stakeholder Working Group

- **State Agencies (6)**
 - e.g., California, New York, North Carolina
- **Federal Agencies (6)**
 - e.g., FERC, FWS, NOAA
- **Environmental Interests and NGO's (4)**
- **Tribes (2)**
- **Industry Trade Association (1)**
- **Electric Utilities (2)**
- **Project Development Interests (2)**

Stakeholder Working Group Engagement

Quarterly In-Person Meetings/Webinars throughout course of projects

- Approx. 10 meeting

Reviews

- SWG has provided at least one review for each individual chapter and appendix.
- SWG has reviewed the full draft report, executive summary

How are we using the SWG?

- The SWG acts as a sounding board to provide feedback on:
 - What data and analysis is most useful to hydropower stakeholders
 - The methodology and selection of projects to include in quantitative analysis and deep-dive case studies
 - Ex. Provided guidance on how to select projects for quantitative analysis (random sample) and general desired breakdown by project type (conventional, NPD, PSH) and licensing (original vs. new license).
 - Who to include in qualitative e-mail elicitations and interviews
 - Ex. Provided a list of contacts to randomly sample for qualitative elicitations

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Qualitative Elicitation

Design of stakeholder elicitation

	E Mail Round 1 (9-15 participants)	E Mail Round 2	Interview
Inquiry A	<ul style="list-style-type: none"> 1 or more representative from each of the following: <ul style="list-style-type: none"> Federal regulatory FERC 1 representative from each of the following: <ul style="list-style-type: none"> 1 state regulatory agency Environmental and other NGOs Tribes Industry Electric utilities Project developers 	Same Individuals as Inquiry A Round 1	1 FERC Stakeholder 1 State Level Regulator 1 Project Developer 1 Cultural, Social and Natural Resource Interest Representative
Inquiry B	<ul style="list-style-type: none"> 3 Representatives from Federal Regulatory Agencies and FERC 9 Representatives from Project Development Interests 	Same Individuals as Inquiry B Round 1	3 Diverse Stakeholders
Inquiry C	<ul style="list-style-type: none"> 3 Representatives from Federal Regulatory Agencies and FERC 9 Representatives from Cultural, Social and Natural Resource Interests 	Same Individuals as Inquiry C Round 1	3 Diverse Stakeholders
Inquiry D	<ul style="list-style-type: none"> Groups same as from Delphi A, but representing Eastern States 	Same Individuals as Inquiry D Round 1	3 Diverse Stakeholders
Inquiry E	<ul style="list-style-type: none"> Groups same as from Delphi A, but representing Western States 	Same Individuals as Inquiry E Round 1	3 Diverse Stakeholders

Sector respondent makeup

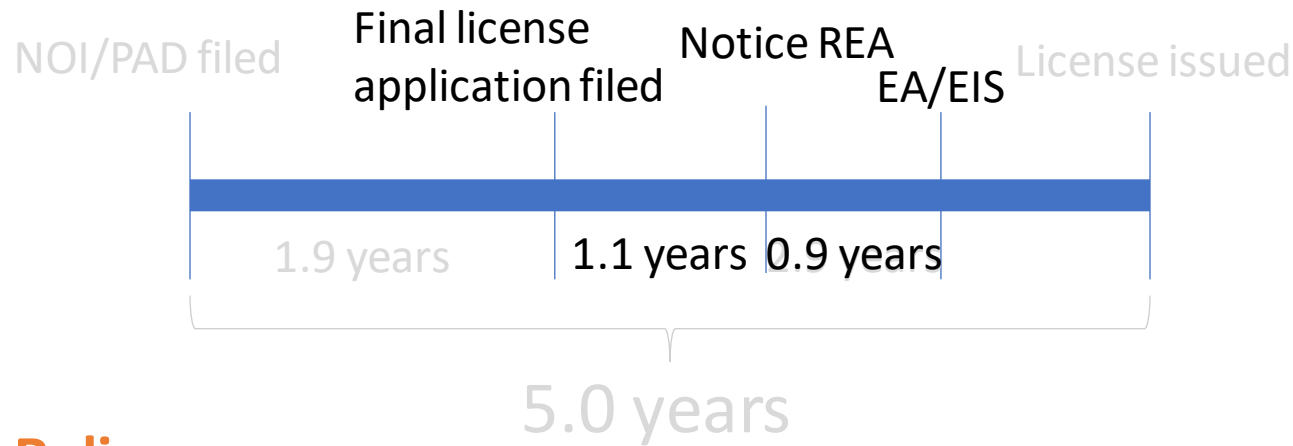
Sector	Sector Respondent Examples	Wave Sectors
Project Development/Utility		A, B, D
	- Electric Utilities	
	- Project Developers - FERC	
Social, Cultural, Natural Resource		A, C, D
	- Indian tribes	
	- U.S. Fish and Wildlife Service	
	- NOAA Fisheries	
	- U.S. Army Corps of Engineers	
	- State water quality/natural resource/species management agency - Nongovernmental organizations	

Stakeholder Affiliation for Each Wave

Stakeholder Sector	Wave A	Wave B	Wave C	Wave D	Total by Sector
FERC	1	3	0	4	8
Federal Land/Resource Agencies	3	0	4	1	8
State Agency	3	0	2	5	10
Developer	1	5	0	3	9
Utility	3	3	0	2	8
Environmental NGO	2	0	5	3	10
Tribe	1	0	0	0	1
Total	14	11	11	18	54

Licensing Timeline Statistics (Chapter 3)

Original License



Relicense

