



US Army Corps
of Engineers

MODEL CERTIFICATION FOR ECOSYSTEM RESTORATION PLANNING MODELS

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5 MAY 2009





OBJECTIVES



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- **Provide an overview of the Model Certification process**
- **Provide info on timing, cost, and schedule for Model Certification**



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MODEL CERTIFICATION





MODEL CERTIFICATION REFERENCES



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- Information Quality Act (PL106-544)
- OMB Information Quality Bulletin for Peer Review
- Report of the Planning Models Improvement Task Force
- Engineer Circular 1105-2-407
- *Updated EC under development*
- Protocols for Certification of Planning Models
- HQ Memo Policy Guidance on Certification of Ecosystem Output Models, Aug 08



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MODEL CERTIFICATION

What is it?



GOAL



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Goal is to establish that planning products are

- Theoretically sound
- Compliant with Corps policy
- Computationally accurate
- Based on reasonable assumptions
- In compliance with OMB Peer Review Bulletin

Toolbox - Ensure high quality methods and tools available to enable informed decisions



MODEL CERTIFICATION



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- Process to review, improve, validate analytical tools and models
- Review of technical soundness
 - ▶ Theory
 - ▶ Computational correctness
- Technical quality
- System Quality
- Usability



CERTIFICATION BASICS



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- Definition - any model or analytical tool used to
 - ▶ Define problems and opportunities
 - ▶ Formulate alternatives
 - ▶ Evaluate effects
 - ▶ Support decision-making
- Planning models, not engineering models
- Review is cost-shared
- In-house or contracted



MODEL BASICS



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Stages of Model Development

- Requirements stage
- Development stage
- External Testing
- Implementation

Model categories

- Corporate
- Regional/local
- Commercial off-the-shelf
- Models developed by others



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MODEL CERTIFICATION

How?



MODEL DOCUMENTATION



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- Provided by model proponent
- Documentation includes (see Protocols Table 2)
 - ▶ Background
 - ▶ Theory, assumptions, analytical requirements, formulas
 - ▶ Software/hardware, testing/validation process,
 - ▶ Availability of input data, usefulness to support project analysis, tech support, training
- Software/spreadsheets also provided



MODEL REVIEW TEAM



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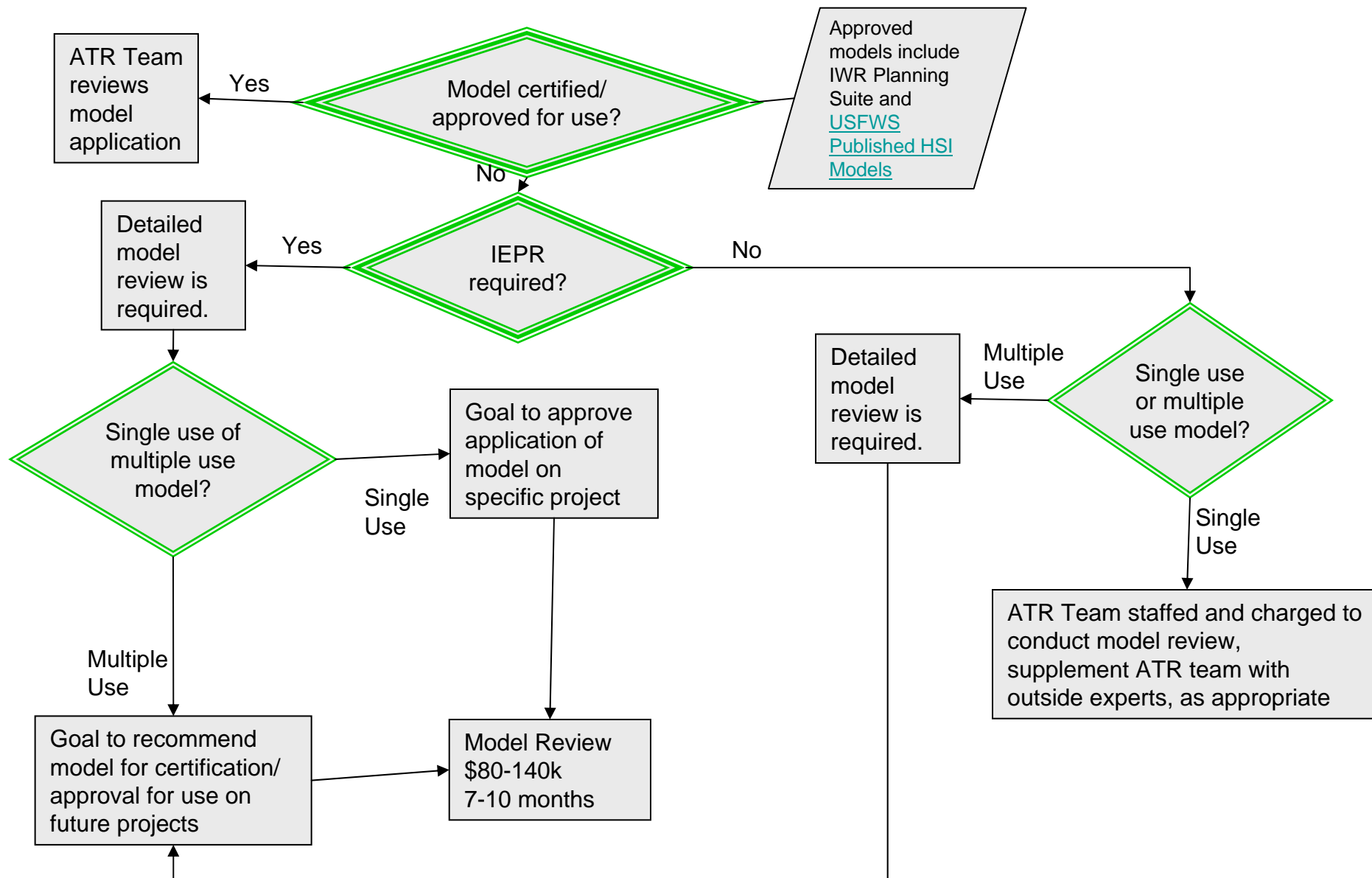
- Planner/Formulator
- Functional Field Expert(s) (internal and/or external)
- Software programmer/spreadsheet auditor



WHAT LEVEL OF REVIEW?



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MODEL CERTIFICATION PROCESS



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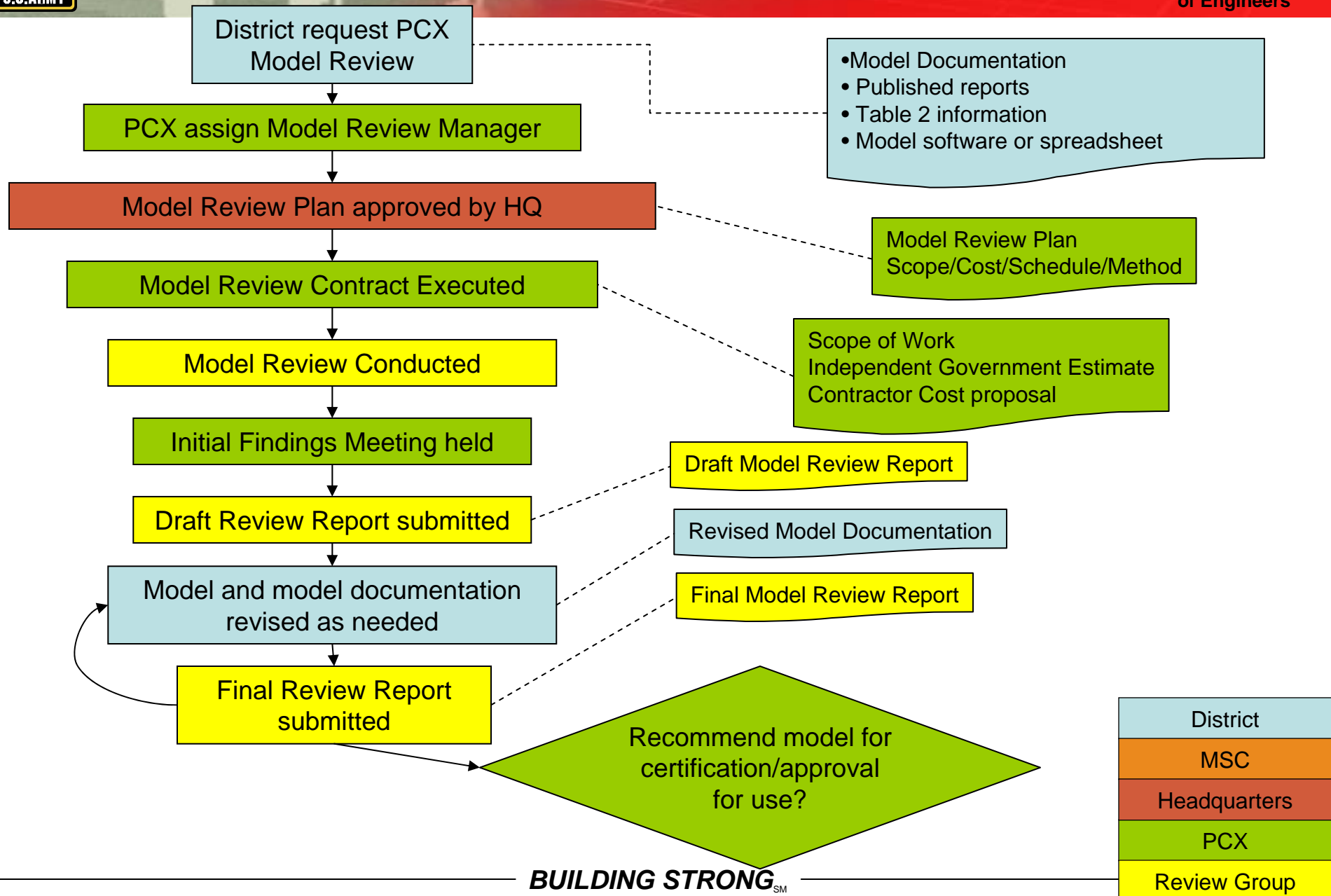
- Develop Model Certification Plan
- Assemble Review Team (In-house/Contract)
- Charge to Reviewers
- Kick-off Meeting
- Conduct Review
- Draft Model Review Report
- Meeting to discuss findings
- Final Model Review Report
- Revise model, as needed (lather, rinse, repeat!)
- PCX recommend that HQ certify model



MODEL REVIEW PROCESS



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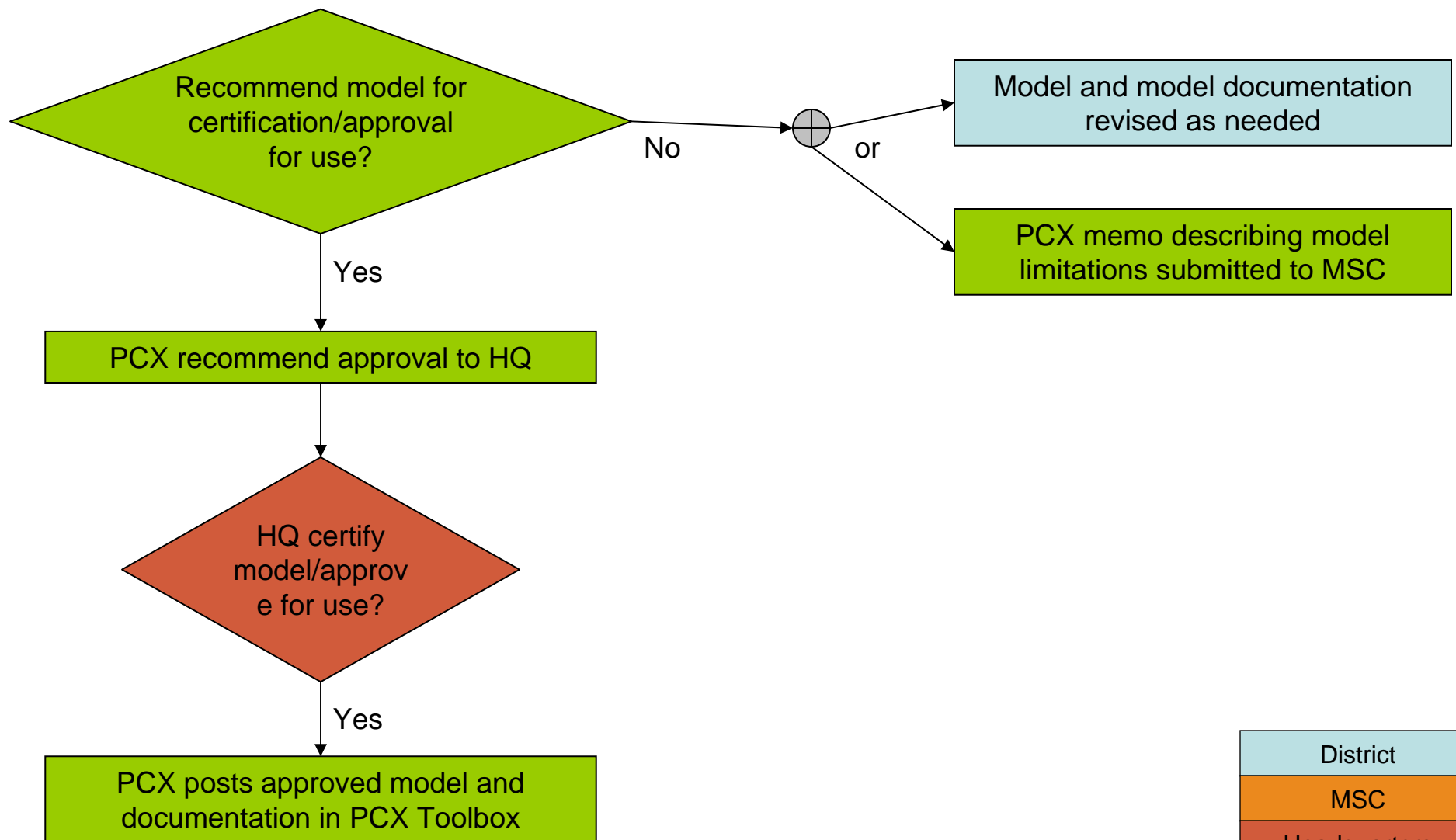




MODEL REVIEW PROCESS (CONTINUED)



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BUILDING STRONG_{SM}

District
MSC
Headquarters
PCX
Review Group



SCHEDULE/TIMING



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Schedule

- Start SOW to Notice to Proceed - 8 weeks
- NTP to Final Model Review Report – 15-18 weeks
- Revise model – depends on PDT
- PCX recommendation to HQ – 4 weeks
- HQ review and certify - ?

Timing

- Requirements and/or development stage
- Identify models at (prior to) Feasibility Scoping Meeting
- Initiate model review prior to Alternative Formulations Briefing



COST



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- ATR – 3 reviewers extra time to review model
- In-house - \$30-50k
- Contract - \$80-140k
- PCX labor ~\$10-15k
- Model proponent labor
 - ▶ Prepare model documentation
 - ▶ Assist in Model Cert contract
 - ▶ Revise model and documentation



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Experience



MODEL CERTIFICATION EXPERIENCE



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2 models certified

- IWR Planning Suite
- Beach-FX

All published USFWS Habitat Suitability
Index models approved for use

Other reviews conducted



ECO-PCX MODEL REVIEWS



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- Island Community Index Model, NAB
- 3 Everglades models
- Upper Miss Fish Passage Effectiveness Index
- Wetlands Value Assessment, MVN
- Habitat Evaluation and Assessment Tools (HEAT) ERDC
- Floodplain forest and wet coastal prairie community models, SWG
- Sacramento River Bank Protection Model, SPK



EXAMPLE - FISH PASSAGE CONNECTIVITY INDEX



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FISH PASSAGE CONNECTIVITY INDEX

A Planning Model Developed for

UPPER MISSISSIPPI RIVER SYSTEM
NAVIGATION AND ECOSYSTEM SUSTAINABILITY PROGRAM

LOCK AND DAM 22 FISH PASSAGE IMPROVEMENTS
ECOSYSTEM RESTORATION PROJECT

23 April 2009

Functional Area:
Planning

Model Developer and Proponent:
Lock and Dam 22 Fish Passage Project Delivery Team



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Rock Island District
St. Louis District
St. Paul District

- Model documentation
– 32 pages
- Review conducted in-house with 4 reviewers
- 67 Comments
- Model Review Report
– 7 pages
- Cost – \$20-30k



EXAMPLE – WETLANDS VALUE ASSESSMENT MODELS



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- 8 models
- Model documentation
~ 180 pages (10-30
pages and 1
spreadsheet/ model
- 6 Reviewers – 1 HEP
expert; 1 planner; 2
coastal ecologists; 1
H&H; 1 spreadsheet
auditor
- Cost ~\$135k

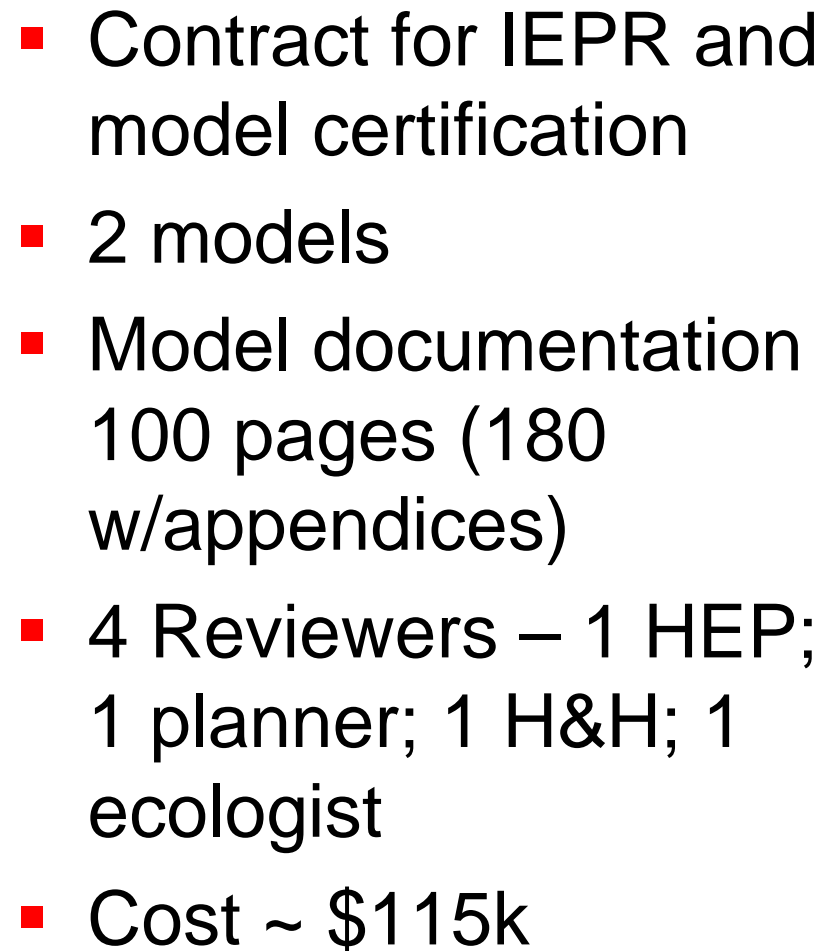
Coastal Wetlands Planning, Protection and Restoration Act
Wetland Value Assessment Methodology
Procedural Manual



Prepared by:
Environmental Work Group

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CHARGE TO REVIEWERS

SAMPLE QUESTIONS



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- Are the assumptions clearly identified, valid, and do they support the analytical requirements?
- Are the formulas used in the models mathematically correct and are the model computations appropriate and done correctly?
- Comment on the ability of the models to address risk and uncertainty.
- Comment on the ability of the models to calculate benefits for total project life.
- To what extent is best professional judgment used in the models?
- How easily are model results understood?
- Are the models transparent and do they allow for easy verification of calculations and outputs?
- Is it clear where the models' geographic boundaries fall?
- Can the models be used for both mitigation and restoration projects?
- Comment on whether all of the most important variables are included in the models.
 - ▶ Are variables that are both stressors and drivers included in the models?
 - ▶ Should additional variables be included?
 - ▶ Are some of the variables more sensitive than others?
- Is each variable clearly described?



HOW CAN THE MODEL PROPOSER HELP?



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- Identify models early
- Prepare model documentation
- Test/validate model
- Check software
- Identify expertise needed
- Be open to process
- Pool funds for multiple-use models



SUMMARY



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- Ensure high quality methods and tools available to enable informed decisions
- “Protocols” and EC 407 are good references
- Timing
 - ▶ Identify models in Review Plan
 - ▶ Discuss models at Feasibility Scoping Meeting
 - ▶ Start cert before Alternative Formulation Briefing
- Cost range \$80-140k for detailed review
- Schedule – 26 weeks



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Questions?