HABITAT CONSERVATION PLAN
EDWARDS AQUIFER

Springflow Habitat Protection Work Group

April 22, 2020
9:00-10:30am

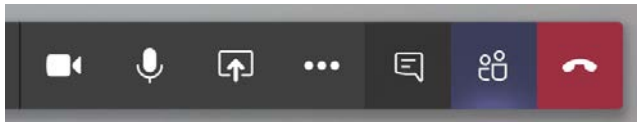
Agenda Overview

- Confirm attendance
- Meeting logistics
- Public comment
- Review and discussion of Work Group Charge
- Completed EAHCP research
- Discussion of presenters
- Public comment
- Future meetings


Confirm attendance

Meeting logistics

- Virtual meeting logistics
  - Mute
  - Chat / Asking questions
  - Polls
  - Meeting recording
  - Member access to files
  - Access on the web



- Meeting points of contact
  - Meeting access
    - Olivia Ybarra (oybarra@...)
    - Damon Childs (dchilds@...)
  - Technical questions
    - Jared Morris (jmorris@...)
  - Participant monitor
    - Kristy Kollaus (kkollaus@...)
  - Chat and Q&A monitors
    - Kristina Tolman (ktolman@...)
    - Damon Childs (dchilds@...)

Meeting logistics

- Work Group logistics
  - Members use Chat
  - Non-members Public comment
  - Collect feedback
  - Develop presentation schedule

Public comment

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Review and discussion of Work Group Charge

FOUR OVERARCHING ISSUES TO BE ADDRESSED

(1) The Implementing Committee should ensure a technical evaluation is undertaken of water quality impacts of predicted extended periods of flow below 80 cfs in both spring systems, either using the Hardy water quality model, but calibrated and validated using data from recent low-flow periods, or using an alternate approach;

(2) The Implementing Committee should ensure a technical evaluation is undertaken of potential impacts of predicted extended periods of flow below 80 cfs on Comal Springs riffle beetle populations;

FOUR OVERARCHING ISSUES TO BE ADDRESSED

(3) The Implementing Committee should ensure that a technical evaluation is undertaken of potential impacts of predicted extended periods of flow below 80 cfs on San Marcos salamander populations, particularly for populations in the area below Spring Lake dam, and on Texas wild-rice and other vegetation serving as habitat for fountain darters downstream of Spring Lake dam, including consideration of impacts from recreation;

(4) The Implementing Committee should ensure … a rigorous review process … to assess the extent to which adaptive management study commitments included in the EAHCP that are related to flow impacts have been met, will be met, or should be adjusted;

Table 1. Springflow Habitat Protection Work Group Tasks and Products

Part	Task	Product	Timeframe
Part 1	Presentations by key scientists and participants (EAHCP staff will handle logistics.)	Identification of issues that were anticipated to be addressed regarding extended periods of low flow	March 20 – June 30
	Work Group (WG) refines questions and issues to be addressed in Part 2	Proposed Part 2 of the Charge elaborating on species questions and issues to be addressed	Ongoing through Aug. 19; presented to IC on Aug. 20.

Table 1. Springflow Habitat Protection Work Group Tasks and Products

Part	Task	Product	Timeframe
Part 2a	Develop SOW(s) for technical experts to identify data gaps and evaluate/review available tools (based on WG input, EAHCP staff will develop draft SOW(s) for review by WG)	SOW(s) to be presented to the IC for approval	August 21 – Oct 7 IC = Oct 8
	RFP(s) and contracting (undertaken by EAHCP staff)	Award contracts to identify data gaps and evaluate/review available tools	Oct. 9 – Jan. 15, 2021
	Contractors present interim results	Presentations to Work Group members	As needed
	Contractors present recommendations to Work Group and Science Committee	Work Group defines/prioritizes next steps	Late 2021

Table 1. Springflow Habitat Protection Work Group Tasks and Products

Part	Task	Product	Timeframe
Part 2b	Develop SOW(s) for studies and/or tool development (based on WG input, EAHCP staff will develop draft SOW(s) for review by WG)	SOW(s) to be presented to IC for approval	Early 2022
	RFP(s) and contracting (undertaken by EAHCP staff)	Award contracts for studies and/or tool development	Mid-year 2022
	Contractors present to Work Group and Science Comm. Results shared with Stakeholders and IC	TBD	TBD

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Completed EAHCP research

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SHP WG - Phase I Research Activities

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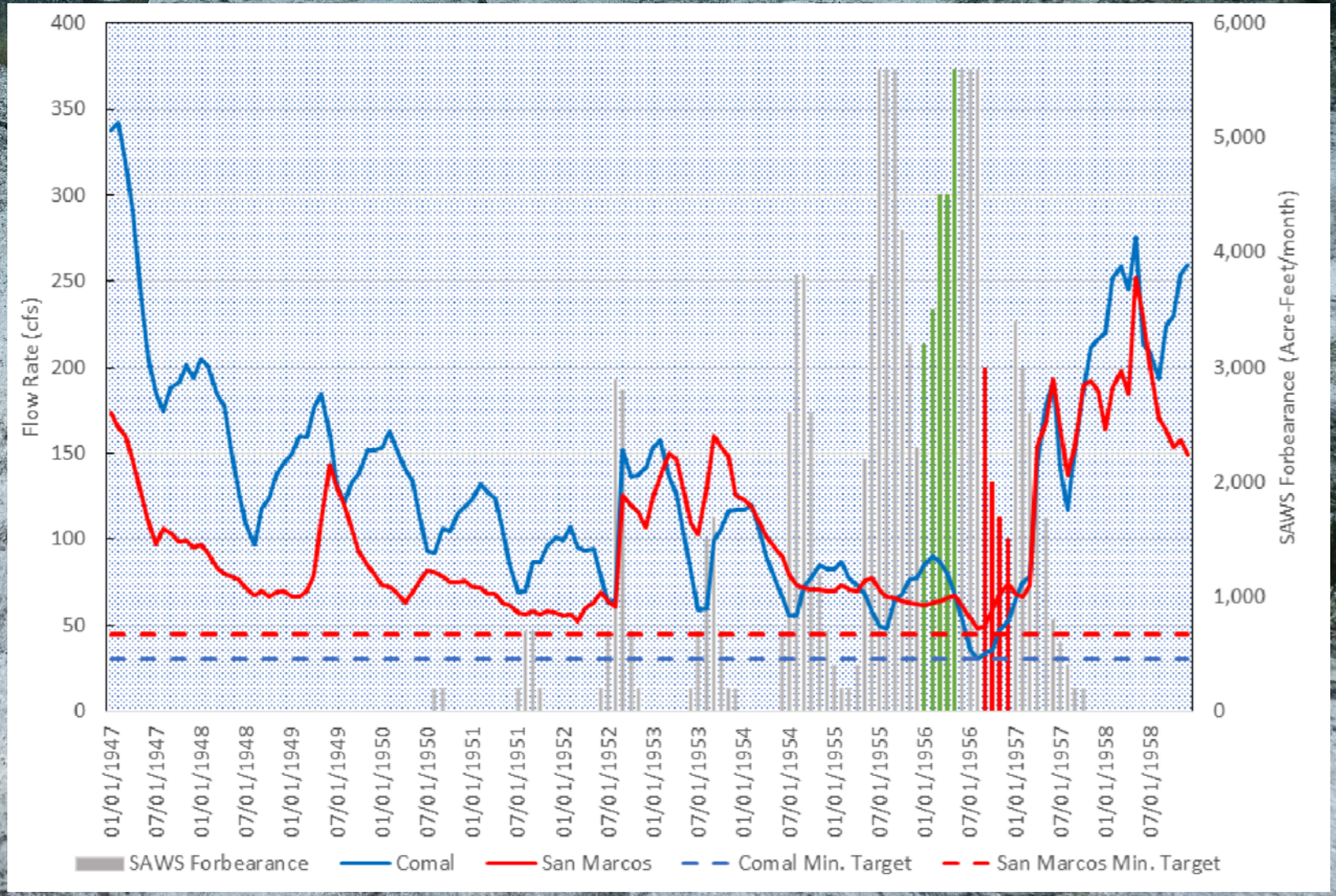
Springflow Habitat Protection WG

- The VISPO AMP Scientific Evaluation Report contains the predicted Phase II flow regime through a repeat of the DOR (EAHCP 2019).

- Changes to springflow protection measures described in the EAHCP are an addition of 1,795 ac·ft yr^{-1} to the VISPO program.



Springflow Habitat Protection WG

Springflow Biological Objectives (RECON 2012) § 4.1 EAHCP

Springflow protection measures (RECON 2012) § 5.1 & 5.5 EAHCP

MODFLOW model (Liu et al. 2017)

Phase II modeling assumptions (Pence 2018a, 2018b)

VISPO AMP SER (EACHP 2019)

Springflow Habitat Protection WG

Questions central to the SHP-WG Charge surround specific impacts during ‘extended periods of low flow’

- Water quality
- Texas Wild-Rice and other vegetation downstream of Spring Lake
- San Marcos salamander populations
- Comal Springs riffle beetle populations

Springflow Habitat Protection WG

- Today’s presentation goal:
  - Identify completed Phase I activities related to charge topics.
  - Not attempting to recap projects in detail or relate them to outcomes of the Charge questions.
  - Documents discussed today are available on Teams site and hyperlinked in presentation.

Springflow Habitat Protection WG

Primary activities available for review:

- Applied Research Program (§ EAHCP 6.3) 2013-2019
- Ecological Model (§ EAHCP 6.3) 2014-2017
- National Academies of Sciences 3 part review 2014-2018
  - 2014 drought – Biological monitoring

Springflow Habitat Protection WG

Applied Research Program (§ EAHCP 6.3) - 2013-2019

- Support development of Ecological Model
  - Tier A
    - Fountain darter habitat and food supply
    - Comal Springs riffle beetle habitat associations and movement
  - Tier B
    - Direct Impacts to Covered Species
  - Tier C
    - Testing repeat occurrences of low-flow or combination of effects

Springflow Habitat Protection WG

Ecological Model (§ EAHCP 6.3) - 2014 – 2017

- Fountain Darter modeling system (Hardy, Oborny, et al. 2017)

- The EcoModel addresses the ability of Phase 1 flow regimes to meet the biological goals for the fountain darter.

- EcoModel was originally planned to model fountain darter and CSRB (EAHCP Ecosystem Modeling Team 2013)

Springflow Habitat Protection WG

National Academies of Sciences 3 part review – 2014-2018

- NAS 1 - Hydrologic Modeling, Ecological Modeling, Monitoring, Applied Research (NRC 2015).
- NAS 2 - Hydrologic Modeling, Ecological Modeling, Monitoring, Applied Research, Mitigation and Minimization Measures (NRC 2016).
- NAS 3 - Consensus report on whether EAHCP as-implemented meets goals (NRC 2018).

Questions?

Water Quality Impacts

...technical evaluation is undertaken of water quality impacts of predicted extended periods of flow below 80 cfs in both spring systems, either using the Hardy water quality model, but calibrated and validated using data from recent low-flow periods, or using an alternate approach;

Technical Assessments in Support of the Edwards Aquifer Science Committee “J Charge” Flow Regime Evaluation for the Comal and San Marcos River Systems (Hardy 2009)

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Report summarizes the flow dependent characteristics of physical habitat for fountain darter, TWR, and CSRB to support the EARIP in development of their recommendations for flow regimes under SB2 J charges.

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Report summarizes the flow dependent characteristics of physical habitat for fountain darter, TWR, and CSRB to support the EARIP in development of their recommendations for flow regimes under SB2 J charges.

Thom's development and interpretation of hydrodynamic model (MDSWMS) and water quality model (QUAL2E) are included in this report.

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EcoModel directly adopted the MDSWMS and QUAL2E models to describe hydraulics and water quality.

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Recent low-flow periods

- EAHCP operates a network of 23 temperature monitoring stations in Comal and San Marcos
- 2014 Biological Monitoring report and Critical Period reports contain data during recent low-flows (BIO-WEST 2015a, 2015b).

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National Academies Report 3

- Chapter 4. “Will the Minimization and Mitigation Measures Meet the Biological Objectives?”
  - Flow Protection Measures
  - Water Quality Protection Measures

Questions?

TWR and other Fountain Darter habitat

…technical evaluation is undertaken … on Texas wild-rice and other vegetation serving as habitat for fountain darters downstream of Spring Lake dam, including consideration of impacts from recreation;

Applied Research Program

1. Low-flow threshold evaluation of native aquatic vegetation – Pond experiment (BIO-WEST 2013)
2. Laboratory versus field comparison of flow for aquatic vegetation in the Comal ecosystem (BIO-WEST 2013)
3. Bicarbonate utilization by SAV (pH Drift Study) (BIO-WEST 2013)
4. Algae and dissolved oxygen dynamics of Landa Lake and the Upper Spring Run (BIO-WEST 2015)
5. Ludwigia repens interference plant competition (BIO-WEST and CRASR 2015)
6. Suspended sediment impacts on Texas wild-rice & other aquatic plant growth characteristics & aquatic macroinvertebrates (Crawford-Reynolds et al. 2017)
7. Distributional patterns of aquatic macrophytes in the San Marcos and Comal Rivers from 2000 to 2015 (Hutchinson and Foote 2017)

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Applied Research Program

1. Low-flow food source threshold study (BIO-WEST 2013)
2. Effects of low flow on fountain darter reproductive effort (BIO-WEST 2014)
3. Effects of predation on fountain darters (Texas State University and BIO-WEST 2014)
4. Fountain darter movement under low flow conditions in the Comal Springs/River ecosystem (BIO-WEST 2014b)

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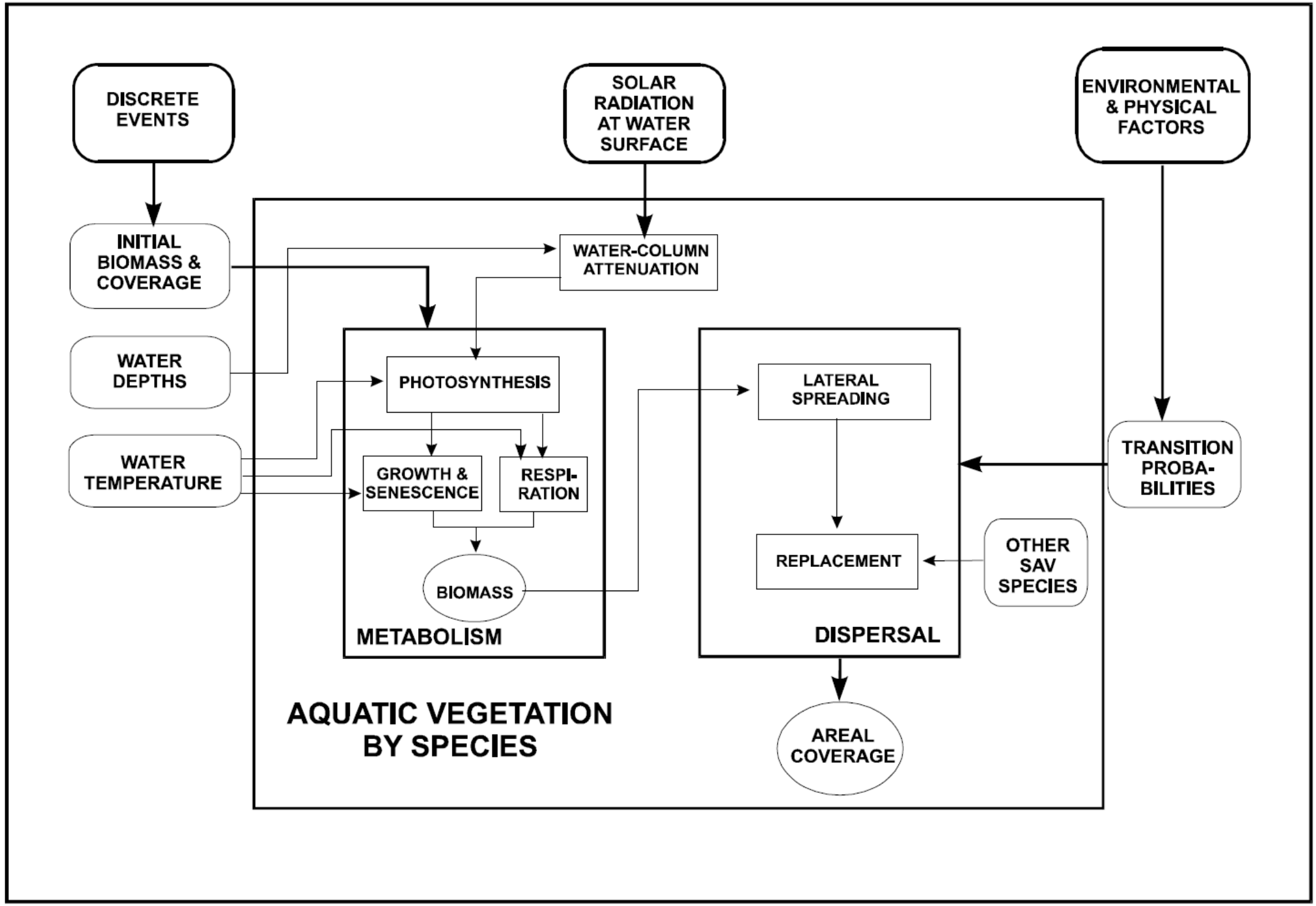
EcoModel

- The SAV submodel simulates vegetation growth, density, and colonization of several important species found in Comal and San Marcos (Hardy T., Oborny E., et al. 2017; NRC 2016).

- SAV submodel chapters in EcoModel report
  - 2.1.3 – Main components
  - 2.2.2 – Structure
  - 2.3.1 – Performance


DISCRETE EVENTS
SOLAR RADIATION AT WATER SURFACE
ENVIRONMENTAL & PHYSICAL FACTORS
INITIAL BIOMASS & COVERAGE
WATER-COLUMN ATTENUATION
WATER DEPTHS
PHOTOSYNTHESIS
WATER TEMPERATURE
GROWTH & SENESCENCE
RESPI-RATION
BIOMASS
METABOLISM
LATERAL SPREADING
TRANSITION PROBA-BILITIES
REPLACEMENT
OTHER SAV SPECIES
DISPERSAL
AQUATIC VEGETATION BY SPECIES
AREAL COVERAGE

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National Academies Report 3

- Chapter 3. “Will the Biological Objectives Meet the Biological Goals”
  - Texas Wild-Rice
  - Fountain Darter
- Chapter 4. “Will the Minimization and Mitigation Measures Meet the Biological Objectives?”
  - Submerged Aquatic Vegetation Restoration

Questions?

Comal Springs riffle beetle population

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Refugia Research program

- One of two species targeted for fully functioning Refugia (SMARC 2018)
  - Captive population nutrition & longevity of the Comal Springs riffle beetle (USFWS 2019)
  - Comal Spring riffle beetle (Heterelmis comalensis) pupation enhancement interim report (BIO-WEST 2019)
  - Factors Affecting Pupation in the Endangered Comal Springs Riffle Beetle (Nowlin 2019)

- CSRB Refugia Research activities are ongoing in 2020 and planned for 2021

Comal Springs riffle beetle population

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National Academies Report 3

- Chapter 2 & 3. “Will the Biological Objectives Meet the Biological Goals”
  - Comal Springs Riffle Beetle
- Chapter 4: “Will the Conservation Measures Meet the Biological Objectives”
  - Comal Springs Riffle Beetle

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Planned CSRB activities outside of Refugia

- Population surveys in 2022 and 2025
- Cotton Lure Efficiency Laboratory Study (2020)
- Annual Work Group meeting

Questions?

San Marcos salamander population

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National Academies Report 3

- Chapter 3. “Will the Biological Objectives Meet the Biological Goals”
  - San Marcos salamander

San Marcos salamander population

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Refugia program

- One of two species targeted for fully functioning Refugia (SMARC 2018)
  - 2019 Salamander Reproduction Research Report Investigating San Marcos Salamander Reproduction in Captivity (Campbell and Anderson 2019)

- San Marcos salamander Refugia Research activities are ongoing in 2020 and planned for 2021

Questions?

HABITAT CONSERVATION PLAN
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Identification of presenters

Public comment

Future meetings

- Webinars
  - 1.5 hours?
  - May-June (~4 meetings)
    - 2 Presenters w/ discussion
  - July/August (1 or 2 meetings)
    - Follow up discussions
  - Expect Doodle polls for dates

Thank you!

eahcp@edwardsaquifer.org