EAHCP Science Committee Meeting

Tuesday, November 10, 2015

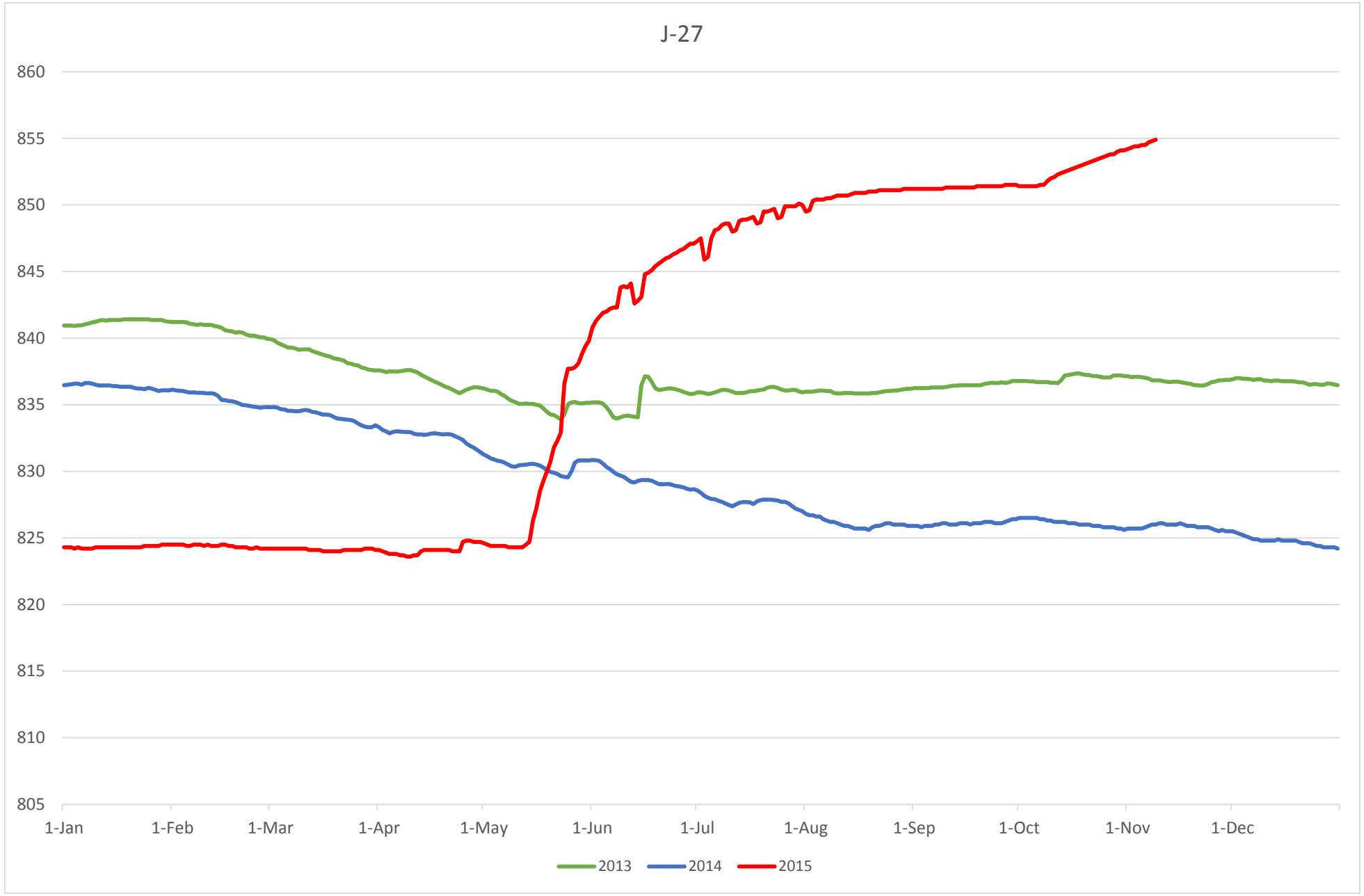
Springflows and Index Well Levels

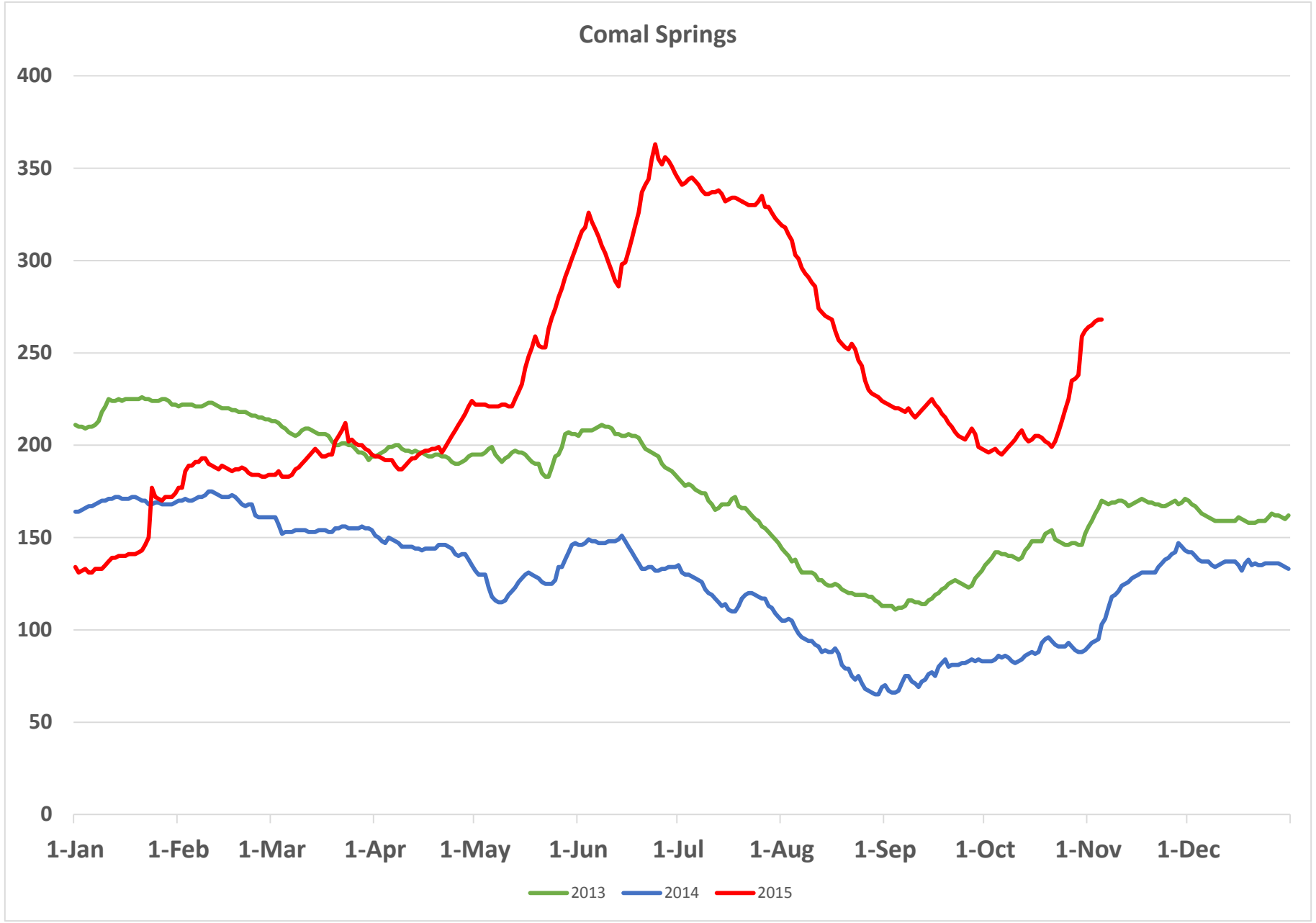
As of *November 10, 2015*

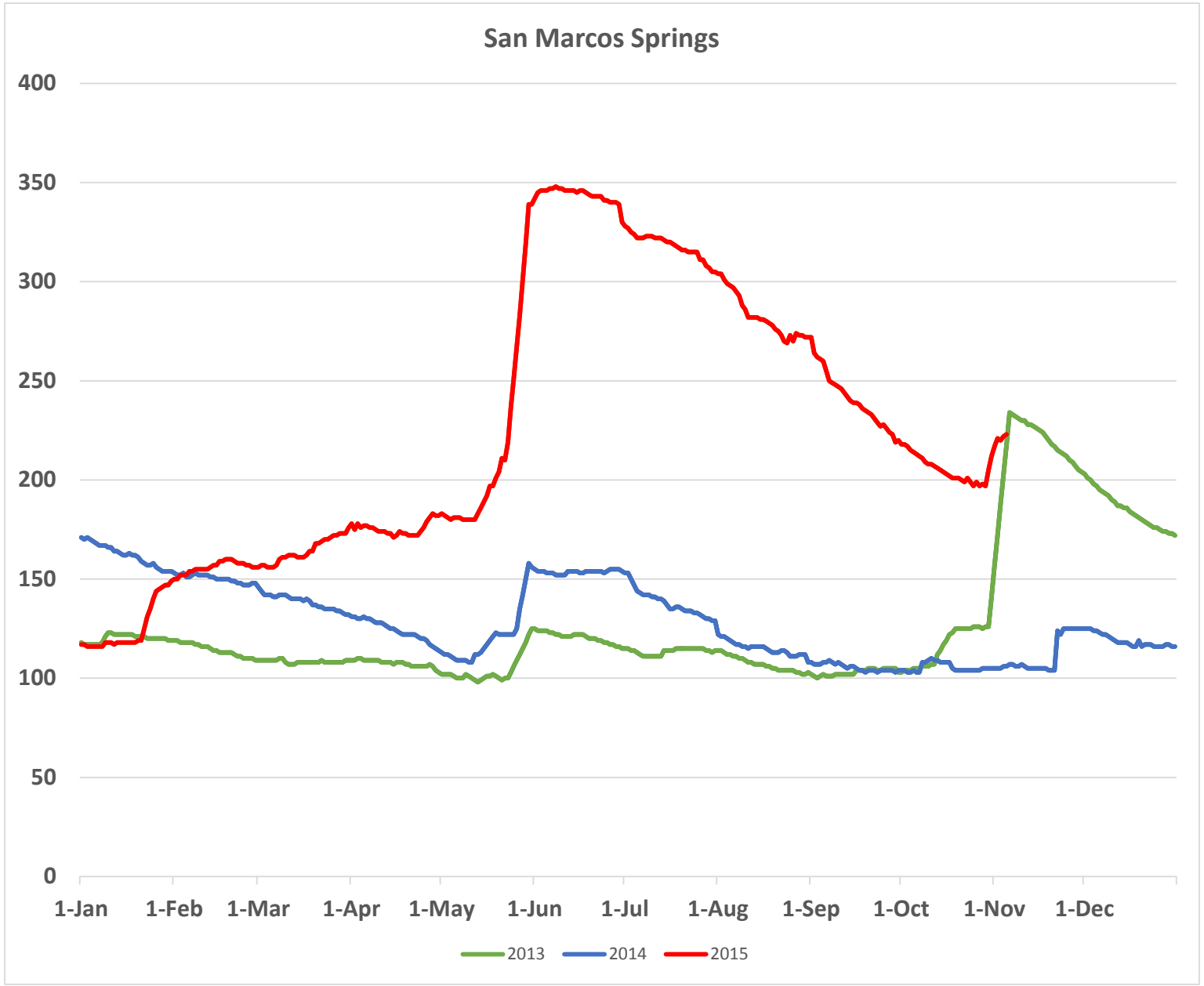
Water Levels & Springflows

Well/ Spring	Today Nov. 10, 2015	1-Month Oct. 10, 2015	1-Year Nov. 10, 2014	October Historical Average	Overall Historical Average
J-17 (MSL)	661.09	645.3	636.6	664.7	666.5
J-27 (MSL)	854.9	852	826.1	867	867.4
Comal (cfs)	229	203	121	287.5	289
San Marcos (cfs)	Flood - TBD	208	107	172.8	166


J-17
680
670
660
650
640
630
620
610
600
1-Jan
1-Feb
1-Mar
1-Apr
1-May
1-Jun
1-Jul
1-Aug
1-Sep
1-Oct
1-Nov
1-Dec
2013
2014
2015


J-27
860
855
850
845
840
835
830
825
820
815
810
805
1-Jan
1-Feb
1-Mar
1-Apr
1-May
1-Jun
1-Jul
1-Aug
1-Sep
1-Oct
1-Nov
1-Dec
2013
2014
2015


Comal Springs
400
350
300
250
200
150
100
50
0
1-Jan
1-Feb
1-Mar
1-Apr
1-May
1-Jun
1-Jul
1-Aug
1-Sep
1-Oct
1-Nov
1-Dec
2013
2014
2015


San Marcos Springs
400
350
300
250
200
150
100
50
0
1-Jan
1-Feb
1-Mar
1-Apr
1-May
1-Jun
1-Jul
1-Aug
1-Sep
1-Oct
1-Nov
1-Dec
2013
2014
2015

2016 Riffle Beetle Applied Studies

Long-Term Elevated Temperature and Low Dissolved Oxygen Tolerances of Larvae and Adult Comal Springs Riffle Beetle

- ***Weston Nowlin, Texas State University***
- ***Benjamin Schwartz, Texas State University***

Life History of the Comal Springs Riffle Beetle from Egg to Adult

- ***Ed Oborny, Bio-West***
- ***Don Sada, Desert Research Institute***
- ***Randy Gibson, SMARC and Bio-West***
- ***Weston Nowlin, Texas State University***

Trophic Level Status and Functional Feeding Group Categorization of Larvae and Adult Comal Springs Riffle Beetle

- ***Weston Nowlin, Texas State University***
- ***Dittmar Hahn, Texas State University***

2016 Riffle Beetle Applied Studies

- ***Long-Term Elevated Temperature and Low Dissolved Oxygen Tolerances of Larvae and Adult Comal Springs Riffle Beetle***

Science Committee	Proceed?
	Offeror 1 – Texas State
1	Yes
2	Yes
3	Yes
4	Yes
5	Yes
6	No
7	No reply
8	Did not state
9	Abstained
10	Abstained
11	Abstained

2016 Riffle Beetle Applied Studies

- ***Life History of the Comal Springs Riffle Beetle from Egg to Adult***

Science Committee	Proceed?	
	Offeror 1	Offeror 2
1	Yes	No
2	Yes	No
3	Yes	No
4	Did not state	Did not state
5	Yes	No
6	No	Yes
7	No reply	No reply
8	No	No
9	Yes	No
10	Abstained	Abstained
11	Abstained	Abstained

2016 Riffle Beetle Applied Studies

- ***Trophic Level Status and Functional Feeding Group Categorization of Larvae and Adult Comal Springs Riffle Beetle***

Science Committee	Proceed?	
	Offeror 1	Offeror 2
1	No	Yes
2	No	Yes
3	No	Yes
4	Yes	No
5	No	Yes
6	No	Yes
7	Did not reply	Did not reply
8	Yes	Yes
9	Yes	Yes
10	Abstained	Abstained
11	Abstained	Abstained

Adaptive Management – Veg Restoration Information Gathering/Analysis

Issue:

- Success of Plantings
- TWR and Natives regime
- Timeline to achieve Biological Goals
- Operation of Flow-split Infrastructure

Utilize Desktop Analysis to:

- generate information and data for consideration by the EAHCP Implementing Committee when evaluating potential changes to vegetation restoration through the EAHCP Adaptive Management process.
- establish a timeline, with annual goals, to achieve the vegetation restoration Biological Goals in the EAHCP. This timeline and information will be used in the preparation of annual work plans by the Permittees.
- use lessons learned from field experience in the first years of implementation, to if necessary, modify methodologies and vegetative goals, to achieve the Biological Goals of the EAHCP.

Approach for Analysis

- San Marcos and Comal
- Contractors: BIOWEST & TXSTATE
- Co-Principal Researchers: Ed Oborny and Thom Hardy
- Timeline: Begin Dec 2015; conlcude July 2016
- Consensus Approach

- Draft report due March 2016; Final Report due May 2016; presentation to IC in June 2016.

- Probable that the SC will be asked to review the final product

- Task 1 – Snapshot
  - Veg Restoration to Biological Goals
  - Planting Methodologies
  - Flow- split
- Task 2 – Status Quo
  - Timeline
  - Are the current Biological Goals Achievable?
- Task 3 – Recommendations
  - Veg Restoration – location, species, amount of
  - Other conservation measures
  - Flow-split
  - Measurement of Compliance (mapping event)

Background

1. NAS RRWG recommended the creation of an Applied Research Work Group (ARWG) to establish a research project schedule for the remainder of Phase I

2. NAS RRWG recommended the ARWG address: (1) If additional research studies are needed; and (2) Developing a plan prioritizing the studies recommended by NAS, the Science Committee, the Implementing Committee, and independent subject matter experts

2015 Applied Research Work Group
Purpose

To recommend a holistic schedule of research projects necessary to better understand the Covered Species in order to achieve the Biological Goals and Objectives of the EAHCP.

2015 Applied Research Work Group
Membership

Name	Organization
Dr. Tom Arsuffi, Chair	Texas Tech University/Science Committee
Dr. Janis Bush	UT San Antonio/Science Committee
Bob Hall	Edwards Aquifer Authority
Chad Norris	Texas Parks and Wildlife/Science Committee
Dr. Ken Ostrand	U.S. Fish & Wildlife Service

Categories of Applied Research

1. Conservation measures
2. Standard sampling methods
3. Habitat quality, quantity, and requirements
4. System memory/Disturbance ecology
5. Data

Prioritization for Applied Research

1. **Conservation Measures:** *SAV Restoration, Invasive Removal, Sediment Removal, Flow-Split Management*

2. **Standard sampling methods:** *Comal Springs Riffle Beetle, Peck's Cave Amphipod, Comal Springs Dryopid Beetle*

3. **Habitat quality, quantity, and requirements:** *No high priority projects, although invertebrates were identified as the highest knowledge priority.*

4. **Data analysis:** *All listed species were identified as potential subjects for analysis of existing EAHCP data.*

5. **System memory/Disturbance ecology:** *San Marcos above and below Sewell Park, New Braunfels Old Channel, Landa Lake, and Spring Runs 1-3*

Project Schedule for Applied Research

2016	1. CSRB tolerances of elevated temperature & low DO* (NAS 54)
	2. Evaluate CSRB life history Phase I* (NAS 51, 52, 53, 54)
	3. CSRB Trophic level & functional feeding group categorization* (NAS 51, 55)
	1. CSRB quantitative sampling techniques (NAS 55) (#2 Priority)
	1. Compile data, format, template, normalization; IC consideration in Dec 2015

Project Schedule for Applied Research

2017	1. Evaluate CSRB life history Phase II* (NAS 51, 52, 53, 54)
	1. SAV as FD habitat (shelter, prey habitat) (NAS 45, 46)
	2. Effects of sedimentation on SAV, FD and CSRB (NAS 56)
	1. CS Dryopid Beetle quantitative sampling techniques
	1. Statistical analysis of data (System Memory/Disturbance Ecology)
	2. Statistical analysis of data (Species)

Project Schedule for Applied Research

2018	1. Peck's Amphipod quantitative sampling techniques
	1. Evaluate success of SAV restoration & TWR enhancement
	2. Confirm species-specific Tables 4-1, 4-21
	3. Evaluate success of flow-split management
	1. TBD/Contingency

Project Schedule for Applied Research

2019

1. Evaluate success of removal of invasive animal species and reduction of introduction
2. Evaluate success of Sessom Creek sand bar removal and sediment removal efforts
1. TBD/Contingency

EDWARDS AQUIFER AUTHORITY

HABITAT CONSERVATION PLAN EDWARDS AQUIFER

HABITAT CONSERVATION PLAN EDWARDS AQUIFER

EDWARDS AQUIFER AUTHORITY

TEXAS STATE UNIVERSITY

THE CITY OF SAN MARCOS

City of New Braunfels

San Antonio Water System

GBRA

Scope of Work Review

1

What Quantitative Sampling Method For the Comal Springs Riffle Beetle Will Provide Reliable, Statistically Valid Data?

Note:

This SOW is to develop a uniform, quantitative sampling methodology and should not be confused with methodologies for collecting mass numbers of CSRB.

Task 1. Methodology Development

To include:

- at least 3 methods for *in situ* testing
- create the least disturbance in the system
- be the most result and labor effective, statistically valid
- present to Science Committee for review

Task 2. Conduct Applied Research

To include:

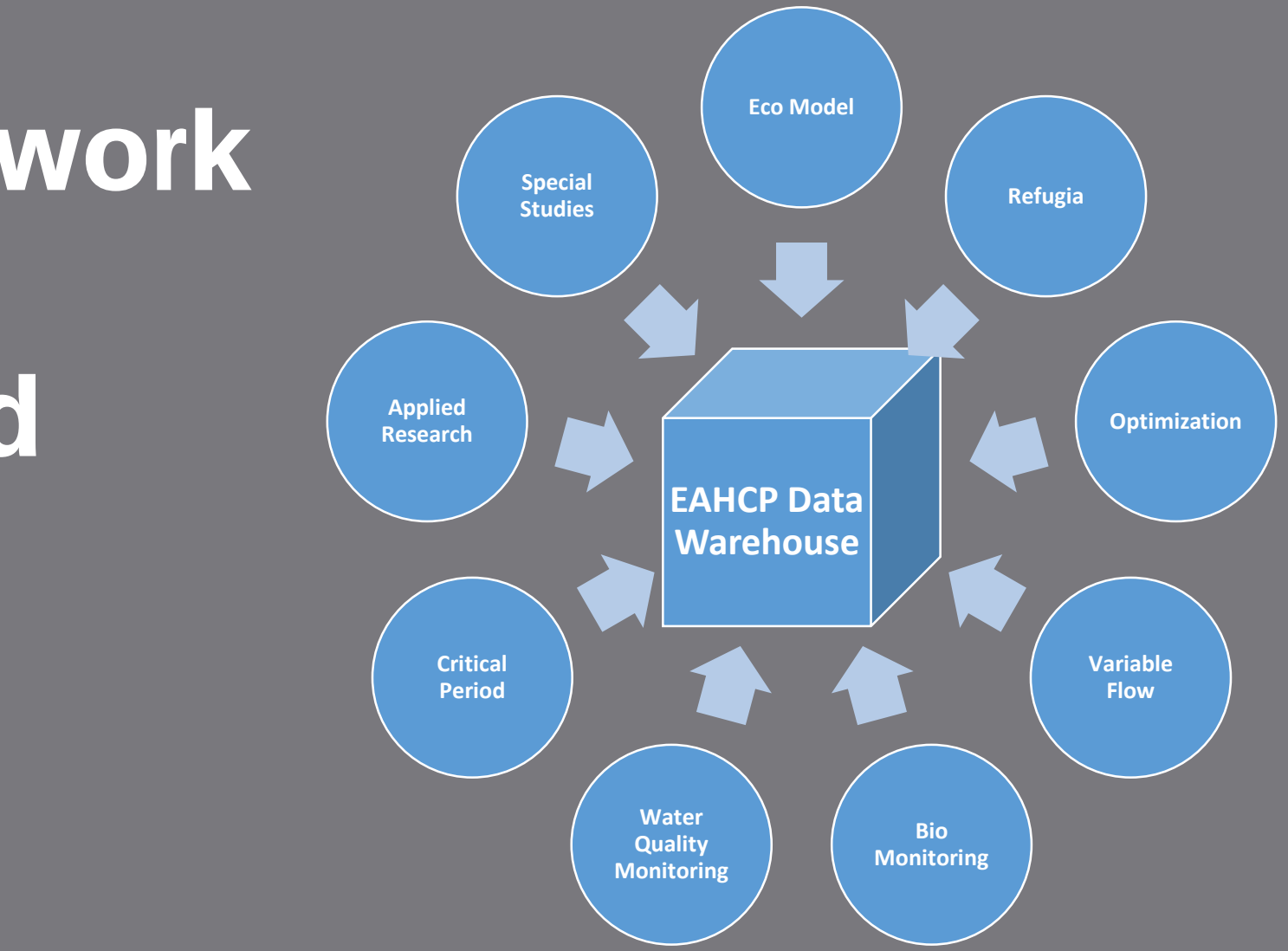
- maintain study notebook
- conduct study and analyze data according to methodologies

Task 3. Draft and Final Reports

- include all assumptions, methodologies and statistics used in study to generate conclusion

Task 4. Meetings and Presentations

Scope of work for an Integrated EAHCP Database



Proposed 2016 Meeting Schedule

1. Wednesday, January 13, 2016
2. Wednesday, March 9, 2016
3. Wednesday, April 13, 2016
4. Wednesday, May 11, 2016
5. Wednesday, June 8, 2016
6. Wednesday, September 7, 2016
7. Wednesday, November 9, 2016

EDWARDS AQUIFER AUTHORITY

HABITAT CONSERVATION PLAN EDWARDS AQUIFER

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