Appendix B Stream Evaluation Guidelines:

Goal: Evaluate Appendix B waterbodies to determine whether they meet the current definition of WOTUS and whether listed designated uses are accurate.

The plan is to use ArcMap aerial images of channel conditions, along with the WBID GIS layer, flow regime layer, and a few others to conduct the screening level categorization of waterbodies. The ADEQ intermittent flow spreadsheet should also be used as a primary reference. Evaluations are recorded in the "App B Evaluations" spreadsheet.

Stream Reach Evaluation Method:

1. Check the spreadsheet "App B Evaluations.xlsx" streams tab for assigned streams for each staff member and select a stream reach to evaluate.

	Watershed	Surface Waters	Segment Description and Location (Latitude and Longitude)	A&Wc	A&Ww	A&We	A&Wedw	FBC	PBC	DWS	FC	AgI	AgL
UDI	BW	Big Sandy River	Headwaters to confluence at Alamo Lake at 34°15'36"/113°31'34"		A&Ww			FBC			FC		AgL
UDI	BW	Bill Williams River	Alamo Lake to confluence with Colorado River at 34°18'04"/114°08'1		A&Ww			FBC			FC		AgL
UDI	BW	Boulder Creek	Headwaters to confluence with unnamed tributary at 34°1	A&Wc				FBC			FC	AgI	AgL

2. Open ArcMap and the project "Appendix B project" located at S:\gisuser\phs. Open the "WBID_ac3" layer table, sort by name and find your stream name by matching the spreadsheet list with the "REACH_DESC" and "ORIGIN" and "TERMINUS" fields. QC check that the designated uses and OAW fields in the GIS table match the 2009 Surface water standards Appendix B list. If there are differences, place notes about what's different in the "Records in GIS don't match" column of the spreadsheet.
3. Zoom to selected reach using the 2013 aerial satellite imagery. Look for flow regime type, AZPDES outfalls, dams, OAWs, TMDLs, surface water sites/intermittent sites and mark if present on the spreadsheet.
4. Fill out all fields in the excel spreadsheet including comments on indicators where the reach is found to be ephemeral/non-relatively permanent, to assist in follow-up research. Mark the waterbody as one of the categories described below and in Table 1.
5. **Check for "PERENNIAL in ENTIRETY"**: If the flow regime layer identifies the entire reach as perennial, record the stream reach as Yes for WOTUS "Y-Perennial in entirety".
6. **Check for "ANY SEGMENTS PERENNIAL":** If the flow regime layer identifies any segment of the reach as having perennial flow, record the reach as WOTUS and "Y-RPW, perennial segments present in reach".

   In the example below, Sabino Creek has two reaches in Appendix B. Sabino Cr has perennial and intermittent segments in both reaches. In this case, the spreadsheet would be marked as "Y-RPW, perennial segments in reach" in the Eval_reason field for both reaches, "Yes" for AZPDES outfall in the upstream reach, "No" for OAW on both, and comments listed and checked for records in GIS that don't match.

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BASIN_CODE	WATER_BO_1	HBC	REACH	REACH_DESC	LAST_USER	LAST_RPDAT	REACH_DIST	WATERSHED_	AWC	AWW	AWE	AWEDW	FC	FBC	PBC	DWS	A
SC	ENC	15050302	182D	314718 / 1103657 - Cienega Creek	SDC	1/17/2013	2.8	SC		/			/	/			
SC	GDN	15050302	195A	headwaters - Sawmill Canyon	SDC	1/17/2013	6.4	SC	/				/	/			
SC	GDN	15050302	195B	Sawmill Canyon - Cienega Creek	SDC	1/17/2013	13.6	SC		Y			Y	Y			
SC	LEM	15050302	394A	HEADWATERS - TRIBUTARY AT 322947/1104746	SDC	1/23/2013	3.7	SC	Y				Y	Y			
SC	LEM	15050302	394B	TRIBUTARY AT 322947 / 1104746-SABINO CANYON CREEK	SDC	1/23/2013	1.8	SC		Y			Y	Y			
SC	PAL	15050302	298A	HEADWATERS - TRIBUTARY AT 322234 / 1104556	SDC	1/23/2013	2.1	SC	Y				Y	Y			
SC	PAL	15050302	298B	TRIBUTARY AT 322234 / 1104556-SABINO CANYON CREEK	SDC	1/23/2013	1.2	SC		Y			Y	Y			
SC	SAB	15050302	914A	HEADWATERS - TRIBUTARY AT 323328 / 1104700	SDC	1/28/2013	6.1	SC	/				Y	/		Y	/
SC	SAB	15050302	914B	TRIBUTARY AT 323328 / 1104700 - TANQUE VERDE WASH	SDC	1/28/2013	14.1	SC		Y			Y	Y		Y	Y
SC	WAC	15050302	229A	headwaters - tributary at 31	SDC	1/23/2013	2.8	SC	Y				Y	Y			
SC	WAC	15050302	229B	tributary at 315247 / 110262	SDC	1/23/2013	8.3	SC		Y			Y	Y			
SC	MSC	15050302	224		SDC	3/19/2013	6.733	SC									
SC	MTC	15050302	018	headwaters - Cienega Creek	SDC	1/23/2013	12.5	SC		Y			Y	Y			
SC	AGC	15050302	538B	321851 617/1103351 589	SDC	1/15/2013		SC		Y			/		Y		

*Figure [SEQ Figure * ARABIC]. Sabino Cr. (red dot is WWTP outfall, green dot is Dam, dark blue line is perennial segment)*

7. **Check for "INTERMITTENT RPW with >90 days flow present":** If the reach is on the intermittent flow regime layer and has intermittent flow monitoring sites on reach, check for #days of flow data (spreadsheet of Int flow data). If there are >90 days of recorded flow, mark the reach as WOTUS, "Y-Relatively permanent water (RPW) >90days flow present". If the reach has flow monitoring data with <90days of flow/yr, mark the reach as Maybe using "M-Non-RPW, <90days flow/yr present." Also, note if the channel is a direct or indirect trib to a RPW in the comments field.
8. **Check for "Constructed channels with relatively permanent flow, or discharging to a Trib that is WOTUS"**: This category is for canals. Record as "Y-constructed channel with relatively permanent flow, or discharges to a trib"
9. **Documentation by US Army Corps of Engineers of WOTUS status**
10. **Springs that are perennial and direct tributary to RPW**

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11. **Lakes that are within a RPW stream course or are tributary to a RPW stream or other WOTUS**
12. **For ephemeral streams check for "BED, BANK, ORDINARY HIGH WATER MARK (B,B,OHWM) indicators":** If no other data is available for the reach, determine whether the channel has Bed, Bank, and Ordinary High Water Mark (B,B,OHWM) indicators on the aerial imagery. Bed, Bank, OHWM indicators are listed in the US ACoE "A field guide to the identification of the Ordinary high water mark in the Arid west region of the Western US (Lichvar & McColley, 2008). "Bed and banks means the substrate and sides of a channel between which flow is confined. The banks constitute a break in slope between the edge of the bed and surrounding terrain, and may vary from steep to gradual" as per the Technical support document for the Clean Water Rule: Definition of Waters of the US (USEPA and USACE, 2015). OHWM indicators visible in aerial photography include: 1) changes in vegetation density from the floodplain to the uplands (Figure 1), 2) breaks in slope between the active floodplain and low terrace, and 3) texture associated with reworked particles of the active floodplain based on color tone and brightness comparisons between the floodplain and adjacent terrace/uplands. These are the indicators used by ACE in conducting desktop surveys (p35-36 of Lichvar & McColley). If your reach has a Bed, bank and OHWM, then mark it as Maybe WOTUS "M-Non-RPW, B,B,OHWM present". Verify in the Comments field that at least one of the three OHWM features (veg density, slope break, floodplain texture) were present in the aerial photos. Also, note if the channel is a direct or indirect trib to a RPW in the comments field.

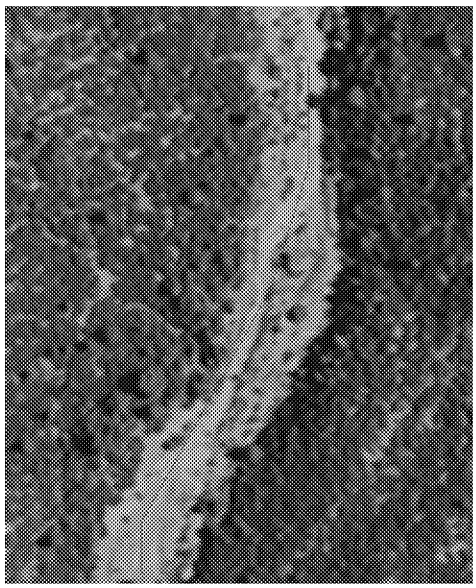

*Figure [SEQ Figure * ARABIC]. Example ephemeral channel with B,B,OHWM - Copper Basin Wash. Note Lighter colored Bed that is free of vegetation, Banks denoted by small lines of vegetation, and OHWM change in vegetation density indicator.*

13. **Other - non-RPW with no B,B,OHWM INDICATORS:** If the reach has ambiguous features in all available aerial imagery, and its unclear whether B,B, OHWM indicators are present, record as Maybe WOTUS "M-Other, Non-RPW, no OHWM indicators."
14. **Channel is a Swale or gully:** If the reach has no difference between Bed and Banks, and no OHWM indicators, record as Not WOTUS "N-Swale or gully; no OHWM indicators." Note that

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"gully" in this case means an erosional headwater feature on the uplands, not a gully as in a "G" Rosgen channel type.

15. **Agricultural drainage ditches:** Another reason for a channel to be Not a WOTUS is if it is an agricultural drainage ditch, constructed for agricultural purposes, and does not discharge to a downstream WOTUS. In this case, mark the channel as Not WOTUS "N-Ag drainage ditches".
16. **Disconnected channels:** If a channel is permanently disconnected by a feature from its downstream channel, record it as Not WOTUS "N-Channel permanently disconnected"
17. **Terminal Basin or waterbody tributary to a terminal basin, such as Willcox Playa:** These terminal basins and tributaries do not connect to downstream RPW or TNWs so they are Not WOTUS category.
18. **Terminal or isolated lakes, or constructed urban lake that is not in a WOTUS**

Re-evaluation of all "Maybe WOTUS" and ephemeral streams and lakes to resolve them to either WOTUS or not-WOTUS. Two ADEQ additional criteria were used to resolve the "maybe WOTUS" streams and lakes to definitely WOTUS: 1) tributary is a direct or indirect tributary to one of Arizona's Large Relatively Permanent Waters, which includes: the Bill Williams River, Colorado River, Little Colorado River, Gila River, Salt River, San Pedro River, Santa Cruz River, and Verde River, and 2) identification of BBOHWM indicators at the mouth of the tributary and for 50% of the channel. The 50% of the channel is measured using the "identify route location" feature in GIS which measures distance upstream from the mouth. The non-perennial streams and lakes in Appendix B will be considered WOTUS if they have:

- Bed, Bank, and OHWM indicators present at the mouth of the tributary and for 50% of the channel length; flows directly or indirectly to a Large River RPW or TNW
- Lake that is located within a tributary with Bed, Bank and OHWM indicators present at the mouth of the tributary and for 50% of the channel length and flows directly or indirectly to a Large River RPW or TNW
- Constructed (man-made or man-altered) channel with non-relatively permanent flow that directly or indirectly discharges to a downstream Large River RPW tributary or TNW
- If none of these conditions apply, the waterbody is considered not-WOTUS.

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Table 1. Categories used in the evaluation of Appendix B waterbodies

WOTUS?	Eval_reason	Comment
Y	Perennial in entirety; flow regime layer	
Y	Wetland adjacent RPW	
Y	RPW, Perennial Segments in reach; flow regime layer	
Y	Y-RPW; >90days flow present	Where Intermittent monitoring data available
Y	Y-Constructed channel with relatively permanent flow, or discharges to a tributary	
Y	Documentation of WOTUS status	
Y	Arizona Large River RPW	
Y	Flows directly/indirectly to Large River RPW or TNW and has channel indicators at mouth and >50% of channel length	
M	M-Non-RPW, <90days flow/yr present	Where Intermittent monitoring data available
M	M-Non-RPW, B,B,OHWM present	
M	M-Constructed channel that connects natural channels with BBOHWM or discharges into a trib or TNW	
M	M-Other, Non-RPW, no BBOHWM indicators	
N	N-Swale or gully; no OHWM indicators	
N	N-Ag drainage ditches	
N	N-Channel permanently disconnected	
N	Isolated Lake	
N	Terminal Lake/basin	
N	Indistinct- no connection evident	
N	Error – no waterbody present	

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Y-Flows directly/indirectly to Large River RPW or TNW and has channel indicators at mouth and >50% of channel length

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