

Standard Operating Procedure (SOP) #5

Selecting Water Quality Sampling Stations

Version 3.02 (March 1, 2021)

Change History

New Version #	Revision Date	Author	Changes Made	Reasons for Change	Previous Version #
1.01	5/31/2016	Scott Kichman	Updated software versions and configuration.	Software no longer in production.	1.0
2.0	12/17/2018	Mark Wasser	Major update to reflect current software and best practices.	Software updates, other updated policies and procedures, standardization across PACN.	1.01
3.0	8/1/2019	Mark Wasser	Removal of outdated materials, update of randomization process in GIS.	Currency with actual PACN procedures, clarity & consistency, ease of use.	2.0
3.01	12/2/2020	Mark Wasser	Updated software and associated procedures, updated directories, no repeating temp Anchialine Pools within a year.	Reflect migration to ArcGIS Pro, Spatial_Info directory changes, and Anchialine Pool changes.	3.0
3.02	3/1/2021	Mark Wasser, Kim Weisenborn	Updated point generation workflow. Added more detail about exported products. Renumbered SOP from #6 to #5; updated SOP references throughout this SOP.	Reflect more efficient methodology and full suite of products produced. Some SOPs were removed or renumbered within the protocol.	3.01

Only changes in this specific SOP will be logged here. Version numbers increase incrementally by hundredths (e.g., version 1.01, version 1.02) for minor changes. Major revisions should be designated with the next whole number (e.g., version 2.0, 3.0, 4.0). Record the previous version number, date of revision, author of the revision, changes made, and reason for the change along with the new version number.

Purpose

This SOP describes how to select water quality sampling stations. Sample stations will be selected within three different sampling frames: accessible reaches of perennial streams, marine waters with potential park impacts, and brackish water resources (anchialine pools, fishponds, and a saline lake).

A master equipment list for the entire Water Quality Vital Signs Monitoring Protocol can be found in Appendix SOP 2.a of SOP #2 General Tasks Prior to Conducting Field Work. The master equipment list should be updated simultaneously if this or any SOP requiring an equipment list is revised. A list

of equipment required to complete the tasks specified in this SOP has been provided in [Appendix SOP 5.a](#) in this SOP.

Selecting Water Quality Sampling Locations

The following steps will be done prior to conducting any field work.

Fixed sampling points were originally generated using ArcMap® 9.3 and Hawth's Tools. No new fixed sites need to be generated, so those procedures are no longer outlined in this SOP.

The three different sampling frames require different methods for temporary sampling station point generation or selection. All three methods are outlined below.

Perennial Streams – Generate random points along streams (polylines).

Marine Areas – Generate random points within sampling frame (polygon).

Anchialine Pools – Select random points from preset list of all available anchialine pools.

Generating and Selecting Random Points for Temporary Sampling Stations

The GIS Specialist or other trained staff will generate and select random points for sampling using ArcGIS® software (as of publication, the version in use is ArcGIS Pro® 2.6.2). Please refer to [Appendix SOP 5.b](#) for a complete sampling schedule and list of points needed for each park and sampling frame.

Generating Random Points for Temporary Sampling Locations in Perennial Streams

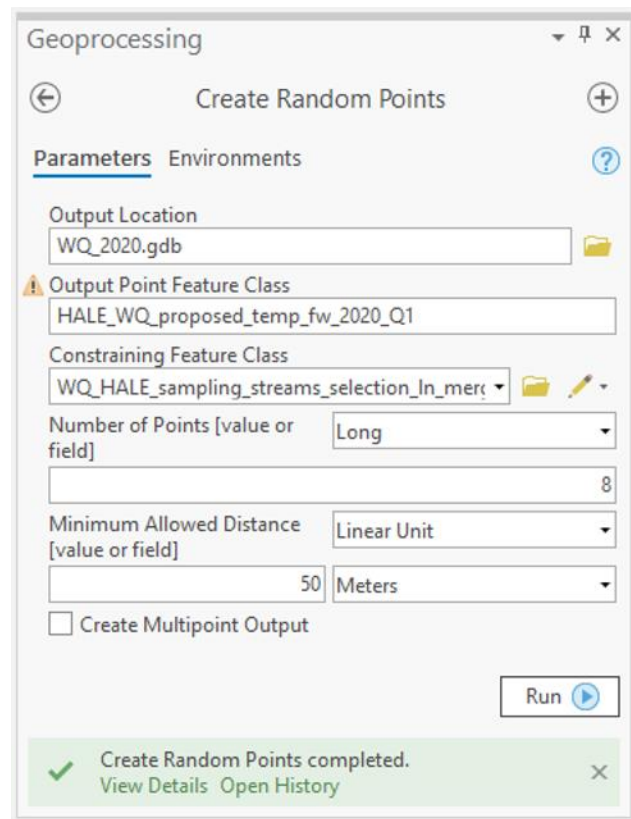
1. Open ArcGIS Pro®, and load the park specific map project and necessary layers including park boundaries, coastlines, roads, trails, and sampling streams. The previous year's Pro Project will be located in the directory indicated below. Save a new copy of the Pro Project to a similar directory for the current year. Previous year's directory:
\\inphavoim01\vital_signs\13_water_quality\Spatial_info\[YYYYY¹][PARK²]\WQ_point_generation\
2. Create a temporary file geodatabase within the current year's WQ_point_generation folder (same directory as above except for current year). This gdb can house all the temporary files created during random point generation.
3. Generate random points along sampling streams.
 - a. Open the "Create Random Points" Tool (Tools button is located within the Analysis Tab, Geoprocessing Group on the Pro ribbon).

¹ [YYYYY] = 4-digit year, referenced throughout this SOP.

² [PARK] = 4-letter park code, references throughout this SOP.

- b. Set *Output Location* and *Output Point Feature Class* to a temp gdb and name as desired. Suggested name = [PARK]_WQ_proposed_temp_fw_[YYYY]_[Quarter]_generation
- c. Select the *Constraining Feature Class*. This will be the sampling stream segments of the sampling frame in question. These feature classes are located within the Water Quality Feature Dataset (PACN.DBO.WQ) of the SDE database [here](#).

Important Note: the sampling stream segments must all be merged into a single attribute or the tool will not run properly. If segments are separate attributes, the number of desired points for the entire stream sampling frame will be generated for each segment regardless of size, and not overall for the sampling frame. In addition to producing too many points, this will skew point generation to the smaller segments.



- d. Enter the desired number of points to be generated in the “Long” field under *Number of Points* [value or field]. Refer to [Appendix SOP 5.b](#) to determine the number of points needed.
 - e. Set the “Linear Unit” field under *Minimum Allowed Distance* [value or field] to 50 meters.
 - f. **Do not** check the box for *Create Multipoint Output*.
 - g. Run the tool. The output generated is the random points.
4. Verify successful point generation. Random points should not be within 50m of one another (this is set in the *Minimum Allowed Distance* input of the tool), but may be within any distance of a fixed points.
 5. Repeat steps 2-3, and then complete steps 6-9 for all ‘sampling frames’ (Quarters).
 6. Add the following data fields for each of the recently generated features classes. [You can copy and paste fields within the Field editor in ArcGIS Pro].

- *Samp_Frame* (Text, 5 characters)
- *Random* (Float)
- *Rnd* (Short Integer)

2021_WQ_point_generation - ArcGIS Pro

HALE_WQ_proposed_tem...1_Q1_generation Fields: HALE_WQ_pro...1_Q4_generation

Current Layer: HALE_WQ_proposed_temp_fw_202

☒ Visible	☒ Read Only	Field Name	Alias	Data Type	☒ Allow NULL	☐ Highlight	Number Format	Domain	Default	Length
☒	☒	OID	OID	Object ID	☐	☐	Numeric			
☒	☐	Shape	Shape	Geometry	☒	☐				
☒	☐	Samp_Frame	Sampling Frame (Quarter)	Text	☒	☐				5
☒	☐	Random	Random	Float	☒	☐	Numeric			
☒	☐	Rnd	Rnd	Short	☒	☐	Numeric			

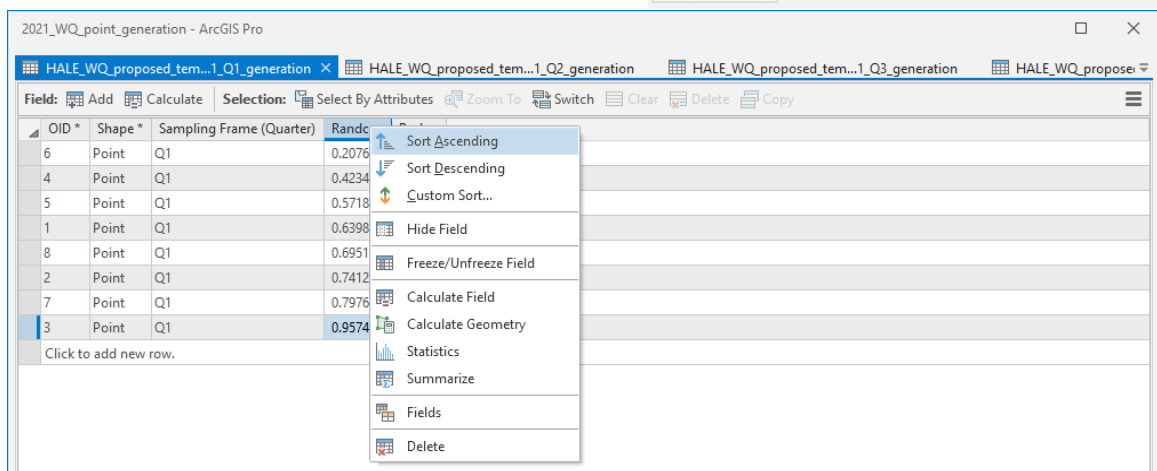
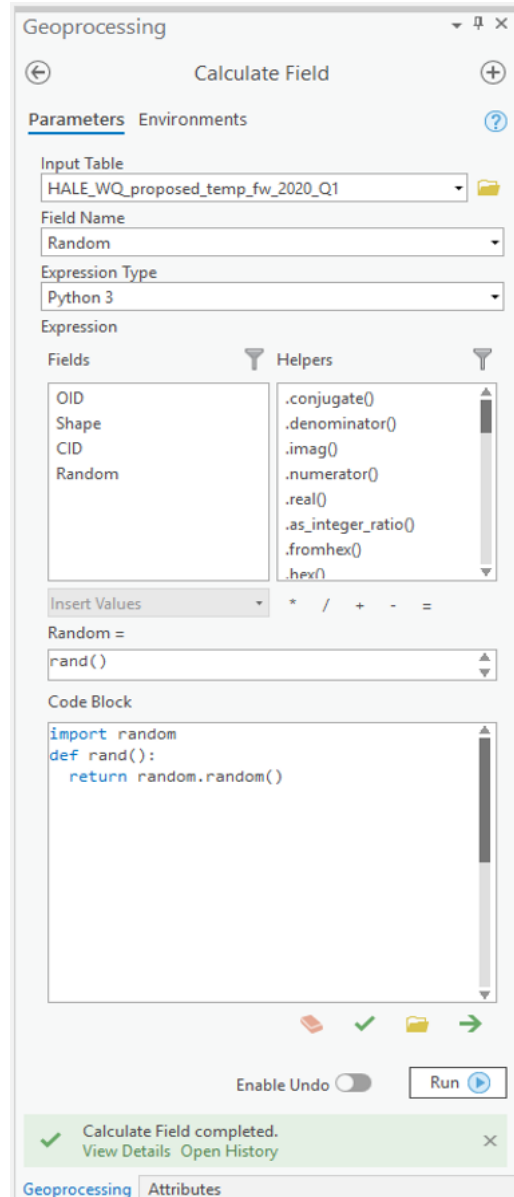
Click here to add a new field.

7. Populate the *Sampling Frame* field with the appropriate Quarter (i.e., Q1, Q2, etc.).

8. Use the Field Calculator to generate a set of random numbers for cells in the *Random* field.
 - a. Within the Field Calculator, make sure the *Expression Type* is set to “Python 3.”
 - b. Type the following code into the *Code Block* field:


```
import random
def rand():
    return random.random()
```
 - c. Then type the following code into the *Random = field*:


```
rand()
```
 - d. Run the tool.
9. Verify a new set of random numbers has been generated in the Random attribute field.
10. Sort (ascending) the attribute table by the *Random* field, and then populate the *Rnd* field with ascending numbers in the order generated by sorting the Random field.



2021_WQ_point_generation - ArcGIS Pro

HALE_WQ_proposed_tem...1_Q1_generation HALE_WQ_proposed_tem...1_Q2_generation HALE_WQ_proposed_tem...1_Q3_generation HALE_WQ_proposed...

Field: Add Calculate Selection: Select By Attributes Zoom To Switch Clear Delete Copy

OID *	Shape *	Sampling Frame (Quarter)	Randc -	Rnd
6	Point	Q1	0.207668	1
4	Point	Q1	0.423441	2
5	Point	Q1	0.571894	3
1	Point	Q1	0.639881	4
8	Point	Q1	0.695178	5
2	Point	Q1	0.741273	6
7	Point	Q1	0.797633	7
3	Point	Q1	0.957405	8

Click to add new row.

0 of 8 selected Filters: 100%

- Run the *Merge* Tool (ArcToolbox → Data Management Tools → General → Merge), and merge all the random point feature classes that have just been created. Suggested name = [PARK]_WQ_proposed_temp_fw_[YYYY]_Q_merge. Open the new merged feature class.
- Define/create schema on the merged feature class, and populate fields as described. [Recommend a schema template is created and then fields are copy/pasted in.] Specify schema as follows:

- Unit_Code (Text, 5 characters long); fill in as appropriate
- Samp_Year (Short integer); fill in as appropriate (yyyy format)
- Station_ID (Text, 15 long); populate in next step
- Loc_Type (Text, 25 long); all cells populated with value “Freshwater”
- Loc_Name (Text, 25 long); populate as appropriate
- Samp_Frame (Text, 5 long); populate with quarter sampling is for (i.e., “Q1”)
- Latitude (Double)
- Longitude (Double)
- Rnd (Short integer); populate with plot number only, no zero in front
- GCS (Text, 50); All cells populated with value “World Geodetic System 1984”
- Geo_Datum (Text, 15); All cells populated with value “D_WGS_1984”

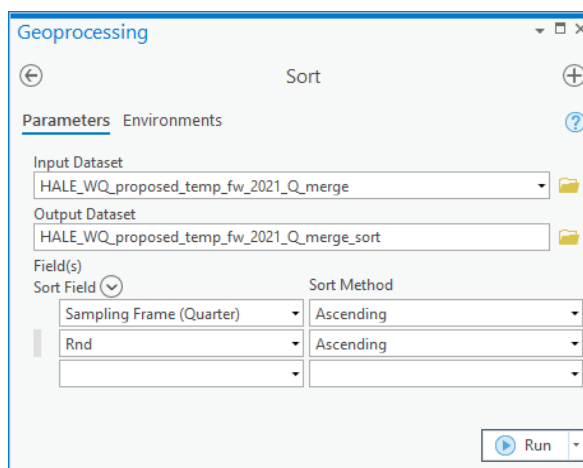
Current Layer HALE_WQ_proposed_temp_fw_2021

Visible	Read Only	Field Name	Alias	Data Type	Allow NULL	Highlight	Number Format	Domain	Default	Length
☒	☒	OBJECTID	OID	Object ID	☐	☐	Numeric			
☒	☐	Shape	Shape	Geometry	☒	☐				
☒	☐	Random	Random	Float	☒	☐	Numeric			
☒	☐	Latitude	Latitude	Double	☒	☐	Numeric			
☒	☐	Longitude	Longitude	Double	☒	☐	Numeric			
☒	☐	Unit_Code	Unit_Code	Text	☒	☐				5
☒	☐	Samp_Year	Samp_Year	Short	☒	☐	Numeric			
☒	☐	Station_ID	Station_ID	Text	☒	☐				15
☒	☐	Loc_Type	Loc_Type	Text	☒	☐		Freshwater		25
☒	☐	Loc_Name	Loc_Name	Text	☒	☐				25
☒	☐	Samp_Frame	Samp_Frame	Text	☒	☐				5
☒	☐	Rnd	Rnd	Short	☒	☐	Numeric			
☒	☐	GCS	GCS	Text	☒	☐		World Geodetic System 1984		50
☒	☐	Geo_Datum	Geo_Datum	Text	☒	☐		D_WGS_1984		15

Click here to add a new field.

13. Select the *Station_ID* field in the attribute table. Populate that field with the temporary point names. The naming convention for temporary stream points is as follows – “*T[PARK][2-digit plot number]_fw*”. Plot numbers start at 01 and ascend in sequence. To do this, use the Field Calculator with Arcade as the Expression Type and input the following expression (WAPA is used as the Park Identifier in the code example below – change as needed when naming for other parks): `"TWAPA0" + $feature.Rnd + "_fw"`. Double check that station ID’s have been properly named *T[PARK]xx_fw* (xx = 01-08 or up to the number of plots required). For example, the third plot on the list for Guam stream sampling in a given quarter would be named “TWAPA03_fw”. *Note:* If more than 9 points have been generated, the Arcade example given will add an extra ‘0’ into the Station_ID for plots 10 and up. To generate proper Station ID’s for plots 10 and higher, remove the ‘0’ after the park identifier in the Arcade example given.

14. Run the Sort Tool (ArcToolbox → Data Management Tools → General → Sort) on the merged feature class. Sort by *Samp_Frame* (ascending), and then by *Rnd* (ascending). Suggested name = *[PARK]_WQ_proposed_temp_fw_[YYYY]_Q_merge_sort*. Open the new feature class and verify proper sorting.



2021_WQ_point_generation - ArcGIS Pro

HALE_WQ_proposed_tem...21_Q_merge_sort

Field: Add Calculate Selection: Select By Attributes Zoom To Switch Clear Delete Copy

OBJECTID*	Shape*	Sampling Frame (Quarter)	Rnd	Unit_Code	Samp_Year	Station_ID	Location Type	Location Name	Latitude	Longitude	GCS	Datum
1	Point	Q1	1	HALE	2020	THALE01_fw	Freshwater	Palikea_Upper	20.669354	-156.056193	World Geodetic Syste...	D_WGS_1984
2	Point	Q1	2	HALE	2020	THALE02_fw	Freshwater	Palikea_Lower	20.665047	-156.048052	World Geodetic Syste...	D_WGS_1984
3	Point	Q1	3	HALE	2020	THALE03_fw	Freshwater	Palikea_Lower	20.669286	-156.052785	World Geodetic Syste...	D_WGS_1984
4	Point	Q1	4	HALE	2020	THALE04_fw	Freshwater	Alelele	20.648213	-156.084438	World Geodetic Syste...	D_WGS_1984
5	Point	Q1	5	HALE	2020	THALE05_fw	Freshwater	Pipiwai	20.673124	-156.056157	World Geodetic Syste...	D_WGS_1984
6	Point	Q1	6	HALE	2020	THALE06_fw	Freshwater	Alelele	20.649648	-156.085816	World Geodetic Syste...	D_WGS_1984
7	Point	Q1	7	HALE	2020	THALE07_fw	Freshwater	Pipiwai	20.670023	-156.05347	World Geodetic Syste...	D_WGS_1984
8	Point	Q1	8	HALE	2020	THALE08_fw	Freshwater	Alelele	20.653527	-156.086539	World Geodetic Syste...	D_WGS_1984
9	Point	Q2	1	HALE	2020	THALE01_fw	Freshwater	Pipiwai	20.677075	-156.056696	World Geodetic Syste...	D_WGS_1984
10	Point	Q2	2	HALE	2020	THALE02_fw	Freshwater	Palikea_Upper	20.669465	-156.057063	World Geodetic Syste...	D_WGS_1984
11	Point	Q2	3	HALE	2020	THALE03_fw	Freshwater	Alelele	20.650196	-156.085617	World Geodetic Syste...	D_WGS_1984
12	Point	Q2	4	HALE	2020	THALE04_fw	Freshwater	Pipiwai	20.678215	-156.056647	World Geodetic Syste...	D_WGS_1984
13	Point	Q2	5	HALE	2020	THALE05_fw	Freshwater	Palikea_Lower	20.665568	-156.050373	World Geodetic Syste...	D_WGS_1984
14	Point	Q2	6	HALE	2020	THALE06_fw	Freshwater	Palikea_Lower	20.663057	-156.042012	World Geodetic Syste...	D_WGS_1984
15	Point	Q2	7	HALE	2020	THALE07_fw	Freshwater	Alelele	20.648333	-156.084633	World Geodetic Syste...	D_WGS_1984
16	Point	Q2	8	HALE	2020	THALE08_fw	Freshwater	Pipiwai	20.674777	-156.05635	World Geodetic Syste...	D_WGS_1984
17	Point	Q3	1	HALE	2020	THALE01_fw	Freshwater	Pipiwai	20.674489	-156.056315	World Geodetic Syste...	D_WGS_1984
18	Point	Q3	2	HALE	2020	THALE02_fw	Freshwater	Palikea_Lower	20.668051	-156.051898	World Geodetic Syste...	D_WGS_1984
19	Point	Q3	3	HALE	2020	THALE03_fw	Freshwater	Pipiwai	20.674018	-156.05635	World Geodetic Syste...	D_WGS_1984
20	Point	Q3	4	HALE	2020	THALE04_fw	Freshwater	Palikea_Lower	20.66373	-156.042976	World Geodetic Syste...	D_WGS_1984
21	Point	Q3	5	HALE	2020	THALE05_fw	Freshwater	Pipiwai	20.677467	-156.056817	World Geodetic Syste...	D_WGS_1984
22	Point	Q3	6	HALE	2020	THALE06_fw	Freshwater	Pipiwai	20.671668	-156.055083	World Geodetic Syste...	D_WGS_1984
23	Point	Q3	7	HALE	2020	THALE07_fw	Freshwater	Palikea_Lower	20.662953	-156.041839	World Geodetic Syste...	D_WGS_1984
24	Point	Q3	8	HALE	2020	THALE08_fw	Freshwater	Palikea_Lower	20.663866	-156.044661	World Geodetic Syste...	D_WGS_1984
25	Point	Q3	9	HALE	2020	THALE09_fw	Freshwater	Palikea_Lower	20.663855	-156.043799	World Geodetic Syste...	D_WGS_1984
26	Point	Q3	10	HALE	2020	THALE10_fw	Freshwater	Pipiwai	20.67082	-156.054252	World Geodetic Syste...	D_WGS_1984
27	Point	Q3	11	HALE	2020	THALE11_fw	Freshwater	Pipiwai	20.676143	-156.056636	World Geodetic Syste...	D_WGS_1984
28	Point	Q3	12	HALE	2020	THALE12_fw	Freshwater	Palikea_Lower	20.663446	-156.042483	World Geodetic Syste...	D_WGS_1984
29	Point	Q4	1	HALE	2020	THALE01_fw	Freshwater	Alelele	20.652366	-156.08592	World Geodetic Syste...	D_WGS_1984
30	Point	Q4	2	HALE	2020	THALE02_fw	Freshwater	Palikea_Lower	20.664072	-156.045901	World Geodetic Syste...	D_WGS_1984
31	Point	Q4	3	HALE	2020	THALE03_fw	Freshwater	Palikea_Upper	20.669423	-156.056937	World Geodetic Syste...	D_WGS_1984
32	Point	Q4	4	HALE	2020	THALE04_fw	Freshwater	Palikea_Upper	20.670029	-156.053725	World Geodetic Syste...	D_WGS_1984
33	Point	Q4	5	HALE	2020	THALE05_fw	Freshwater	Palikea_Upper	20.669885	-156.054361	World Geodetic Syste...	D_WGS_1984
34	Point	Q4	6	HALE	2020	THALE06_fw	Freshwater	Alelele	20.648869	-156.085384	World Geodetic Syste...	D_WGS_1984
35	Point	Q4	7	HALE	2020	THALE07_fw	Freshwater	Pipiwai	20.672923	-156.056021	World Geodetic Syste...	D_WGS_1984
36	Point	Q4	8	HALE	2020	THALE08_fw	Freshwater	Alelele	20.649127	-156.085685	World Geodetic Syste...	D_WGS_1984

Click to add new row.

0 of 36 selected

Filters: 100%

15. Once all points have been generated, attributes populated, and sorted properly, export each quarter as a shapefile (field staff can then upload to Garmin devices using DNRGPS). Files should be exported and named as follows:

- Location =
\\inphavoim01\vital_signs\13_water_quality\Spatial_info\[PARK]\[YYYY]\GIS_Data\
Shapefiles_for_upload
- Shapefile Name = [PARK]_WQ_proposed_temp_fw_[YYYY]_[Quarter]
(e.g., WAPA_WQ_proposed_temp_fw_2021_Q1.shp)

16. Create (or import from previous year) a map layout within the Pro Project, and generate PDF maps for each sampling quarter.

- Export maps to the following directory:
\\inphavoim01\vital_signs\13_water_quality\Spatial_info\[YYYY]\[PARK]\map_products
- Suggested naming convention is:
[PARK]_WQ_fw_[page_size]_[page_orientation]_[YYYY]_[sampling_quarter].pdf
(e.g., KALA_WQ_fw_letter_port_2021_Q1.pdf)

17. Save copies of both Pro map (.mapx) and layout (.pagx) templates in the following directory:
\\inphavoim01\vital_signs\13_water_quality\Spatial_info\[YYYY]\[PARK]\GIS_data\projects

- Suggested naming conventions are:
[PARK]_WQ_fw_[YYYY].mapx (Map Templates)
(e.g., KALA_WQ_fw_2020.mapx)

[PARK]_WQ_fw_[page_size]_[page_orientation]_[YYYY].pagx (Layout Templates).
(e.g., KALA_WQ_fw_letter_port_2020.pagx)

Generating Random Point for Temporary Sampling Locations in Marine Areas

Steps are the same as point generation for perennial streams, with the following changes:

1. From step 3, bullet point 3 – The *Constraining Feature Class* will be the polygon feature class for the marine sampling frame in question. These feature classes are located within the Water Quality Feature Dataset (PACN.DBO.WQ) of the SDE database [here](#).

Important Note: Like the stream segments, the marine sampling frame polygons must all be merged into a single attribute or the tool will not run properly.

The Marine Sampling Frames were delineated with the following criteria:

- Within park boundaries plus adjacent coastal areas that may impact (or be impacted by) the park. Adjacent coastal areas extend to the edges of the watershed(s) in which the park lies.
 - Within 10 to 20 m depth contours.
 - On hard substrate (basalt or limestone, or coral reef) that has been predetermined from the benthic habitat map.
2. Replace ‘fw’ with ‘mr’ and ‘Freshwater’ with ‘Marine’ anywhere those text sequences are used or referenced in script, code, or naming conventions.

Selecting Random Points for Temporary Sampling Locations in Anchialine Pools

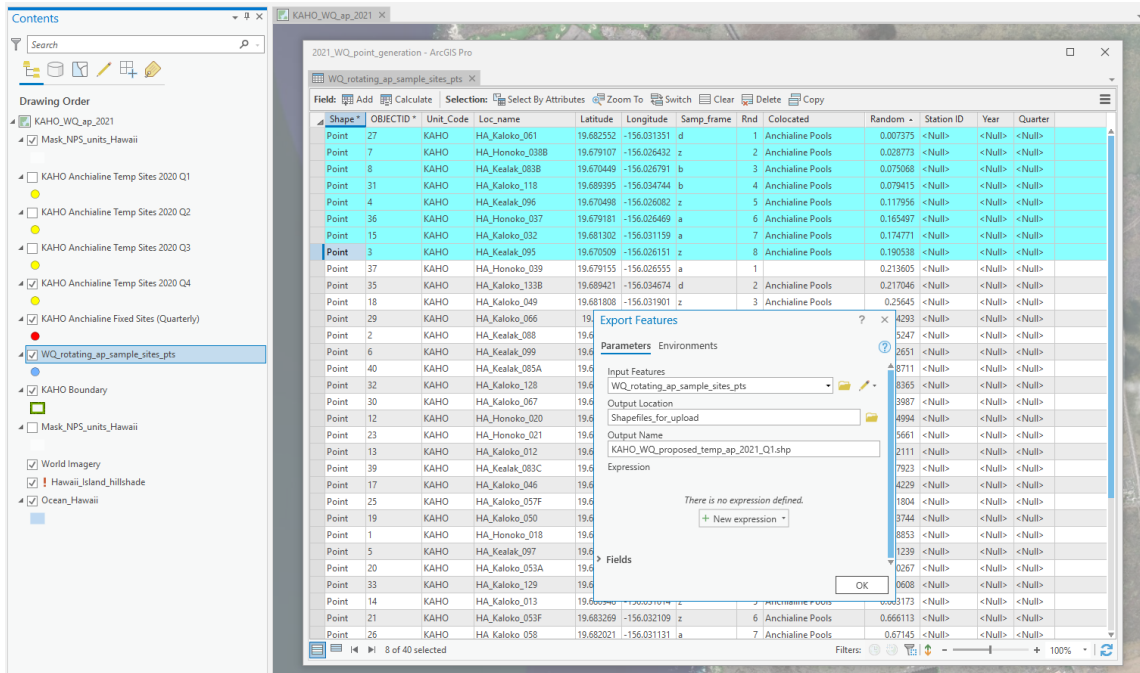
1. Open ArcGIS Pro®, and load the [layer](#) that contains the rotational site list for Anchialine Pools. The source data is the SDE feature class named *WQ_rotating_ap_sample_sites_pts* and is found within the ‘WQ’ Feature Dataset of the PACN.sde database.
2. Open the attribute table and select the field named *Random*. Right click on the *Random* field header and open the Field Calculator (ok to do outside an edit session).
3. Use the Field Calculator to generate a new set of random number for the *Random* attribute field. This will overwrite the existing set of random numbers and be done every time random

points are selected. See step 8 of the stream instructions and follow that same procedures to do this.

4. Once random number have been generated, sort the attribute table by the *Random* field (ascending order).

OBJECTID	Unit_Code	Loc_name	Latitude	Lat_Dir	Longitude	Long_Dir	GCS_Datum	Samp_frame	Colocate	Shape	Random
1	KAHO	HA_Honoko_018	19.676579	North	-156.023617	West	World Geodetic...	b	Anchiali...	Point	0.1359
2	KAHO	HA_Kealak_088	19.670479	North	-156.027374	West	World Geodetic...	z	Anchiali...	Point	0.3319
3	KAHO	HA_Kealak_095	19.670509	North	-156.026151	West	World Geodetic...	z	Anchiali...	Point	0.7826
4	KAHO	HA_Kealak_096	19.670498	North	-156.026082	West	World Geodetic...	z	Anchiali...	Point	0.5517
5	KAHO	HA_Kealak_097	19.670506	North	-156.026043	West	World Geodetic...	z		Point	0.9306
6	KAHO	HA_Kealak_099	19.670537	North	-156.025881	West	World Geodetic...	z		Point	0.8685
7	KAHO	HA_Honoko_038B	19.679107	North	-156.026432	West	World Geodetic...	z	Anchiali...	Point	0.2026
8	KAHO	HA_Kealak_083B	19.670449	North	-156.026791	West	World Geodetic...	b	Anchiali...	Point	0.731
9	KAHO	HA_Kaloko_007	19.682606	North	-156.032519	West	World Geodetic...	c	Anchiali...	Point	0.8757
10	KAHO	HA_Kaloko_009	19.682515	North	-156.032464	West	World Geodetic...	c	Anchiali...	Point	0.3938
11	KAHO	HA_Kaloko_011	19.681221	North	-156.031029	West	World Geodetic...	c		Point	0.5708
12	KAHO	HA_Honoko_020	19.679671	North	-156.030042	West	World Geodetic...	a	Anchiali...	Point	0.4873
13	KAHO	HA_Kaloko_012	19.681095	North	-156.031238	West	World Geodetic...	c	Anchiali...	Point	0.2708
14	KAHO	HA_Kaloko_013	19.680948	North	-156.031014	West	World Geodetic...	z	Anchiali...	Point	0.7026
15	KAHO	HA_Kaloko_032	19.681302	North	-156.031159	West	World Geodetic...	a	Anchiali...	Point	0.2979
16	KAHO	HA_Kaloko_044	19.680208	North	-156.031773	West	World Geodetic...	a		Point	0.4248
17	KAHO	HA_Kaloko_046	19.681683	North	-156.03149	West	World Geodetic...	d	Anchiali...	Point	0.9329
18	KAHO	HA_Kaloko_049	19.681808	North	-156.031901	West	World Geodetic...	z	Anchiali...	Point	0.1158
19	KAHO	HA_Kaloko_050	19.681787	North	-156.03131	West	World Geodetic...	d	Anchiali...	Point	0.8797
20	KAHO	HA_Kaloko_053A	19.683166	North	-156.032665	West	World Geodetic...	c	Anchiali...	Point	0.3807
21	KAHO	HA_Kaloko_053F	19.683269	North	-156.032109	West	World Geodetic...	z	Anchiali...	Point	0.2904
22	KAHO	HA_Kaloko_053H	19.683234	North	-156.031326	West	World Geodetic...	b	Anchiali...	Point	0.0413

5. Random points will only be generated once annually for Anchialine Pools, since pools from the list should not be sampled more than once in a single year. The first 8 pools on the random number sort will be used for Q1 temporary, the next eight for Q2 temporary, etc.
6. Select the first 8 records in the attribute table. Then go back to the Contents Pane, right click on the AnchPool Rotational Site list layer, and select Data → Export.
 - a. Export the 8 selected records to the following folder on the I:\ (share) drive:
`\\imphavoim01\vital_signs\13_water_quality\Spatial_info\KAHO\[YYYY]\GIS_Data\Shapefiles_for_upload`
 - b. Name the exported shapefile as follows:
`KAHO_WQ_proposed_temp_ap_[YYYY]_[Sampling_Quarter]`
 (e.g., KAHOWQ_proposed_temp_ap_2019_Q1.shp)

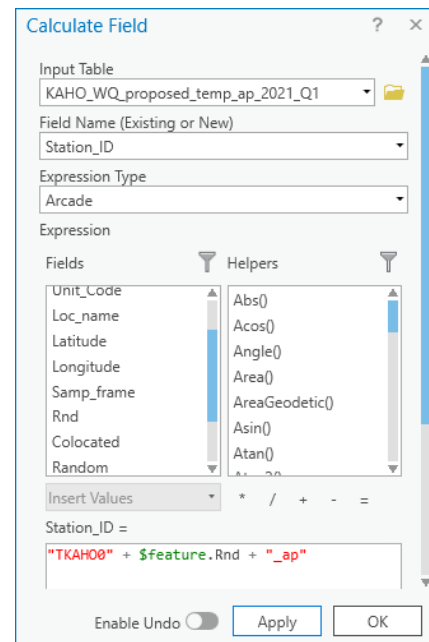


- Bring the exported shapefile in to the existing project, and open the attribute table. Populate the Station_ID field. Use the Field Calculator to populate that field with the following expression (use Arcade as the Expression Type):

"TKAHO0" & ([FID] +1) & "_ap"

Double check that station ID's have been properly named *TKAHOxx_ap* (xx = 01-08r).

- Populate the *Year* and *Quarter* fields in your shapefile as appropriate (these fields are held blank in the AnchPool Rotational Site list layer so they are ready to be populated in the exported shapefile).
- Repeat steps 6 and 7 for Q2-Q4, using each sequential set of 8 records from the list. Name exported shapefiles accordingly. Station_ID naming conventions will repeat for each quarter (always TKAHO01_ap thru TKAHO08_ap).



2021_WQ_point_generation - ArcGIS Pro

KAHO_WQ_proposed_temp_ap_2021_Q1

Field: Add Calculate Selection: Select By Attributes Zoom To Switch Clear Delete Copy

Unit_Code	Loc_name	Latitude	Longitude	Rnd	Colocated	Random	Year	Quarter	Station_ID
KAHO	HA_Kaloko_061	19.682552	-156.031351	1	Anchialine Pools	0.007375	2021	Q1	TKAHO01_ap
KAHO	HA_Honoko_038B	19.679107	-156.026432	2	Anchialine Pools	0.028773	2021	Q1	TKAHO02_ap
KAHO	HA_Kealak_083B	19.670449	-156.026791	3	Anchialine Pools	0.075068	2021	Q1	TKAHO03_ap
KAHO	HA_Kaloko_118	19.689395	-156.034744	4	Anchialine Pools	0.079415	2021	Q1	TKAHO04_ap
KAHO	HA_Kealak_096	19.670498	-156.026082	5	Anchialine Pools	0.117956	2021	Q1	TKAHO05_ap
KAHO	HA_Honoko_037	19.679181	-156.026469	6	Anchialine Pools	0.165497	2021	Q1	TKAHO06_ap
KAHO	HA_Kaloko_032	19.681302	-156.031159	7	Anchialine Pools	0.174771	2021	Q1	TKAHO07_ap
KAHO	HA_Kealak_095	19.670509	-156.026151	8	Anchialine Pools	0.190538	2021	Q1	TKAHO08_ap

Click to add new row.

0 of 8 selected Filters: 100%

Appendix SOP 5.a. Equipment Necessary to Install Fixed or Random Water Quality Sampling Locations

Equipment (#/quantity)	Preparation & Maintenance
GARMIN® Global Positioning System (G.P.S.) unit (1)	Ensure that this equipment is available and set-up appropriately (according to SOP #4a Using Garmin® GPS Units).
AA batteries (6)	Ensure this equipment is available. If rechargeable, ensure fully charged.
Waterproof case with desiccant and strap (1)	Ensure that this equipment is available. Replace desiccant pack biannually or if saturated.
Charts and grid layouts	Ensure that this equipment is available. Store in field binder.
Random number pair list	Create document and store in the field binder.
Compass (1)	Ensure that this equipment is available. Store in field binder.
Map of fixed and random sampling sites (2 copies)	Update prior to each trip with GIS specialist. Print in color to waterproof paper. Label sites. Store in field binder.
Fixed sampling site descriptions (with photo and compass heading)	Print to waterproof paper and store in field binder. Update If necessary prior to subsequent field sampling.
Park brochure and general map	Store in field binder.
ArcGIS Pro 2.x, DNRGPS	Check for software updates regularly

Appendix SOP 5.b. Sampling Schedule and List of Points Needed for Each Park and Sampling Frame

Freshwater Sites

Park	Stream Mon	FW Quarterly Sites	Qtrly Temp Sites Needed	FW Yearly Sites	Yearly Temp Sites Needed	Notes
AMME	n/a	Fixed only	0	n/s	0	
HALE	Q3	Q1, Q2, Q4	8	Q3	12	
KALA	Q3	Q1, Q2, Q4	8	Q3	12	
NPSA	Q3	Q1, Q2, Q4	0	Q3	0	No temp fw sites needed
WAPA	Q1	Q2, Q3, Q4	8	Q1	12	

Marine Sites

Park	Benthic Mon	MR Quarterly Sites	Qtrly Temp Sites Needed	MR Yearly Sites	Yearly Temp Sites Needed	Notes
KAH O	Q4	Q1, Q2, Q3	8	Q4	20	
KALA	Q3	Q2	8	Q3	20	No mr sampling in Q1 and Q4
NPSA	Q2	Q1, Q3, Q4	8	Q2	20	
WAP A	Q2	Q1, Q3, Q4	8	Q2	20	

Anchialine Pool Sites

Park	AP Quarterly Sites	Qtrly Temp Sites Needed	AP Yearly Sites	Notes
ALKA	Fixed only (6)	0	0	FALKA03_ap, FALKA05_ap, FALKA06_ap, FALKA07_ap, FALKA08_ap, FALKA09_ap
KAH O	Q1, Q2, Q3, Q4	8	n/a	
PUH E	Fixed only (3)	0	0	FPUHE01_bb, FPUHE02_bb, FPUHE03_bb
PUH O	Fixed only (5)	5	0	FPUHO02_ap thru FPUHO05_ap and FPUHO08_ap