

Nelson, Dan

From: Nelson, Dan
Sent: Monday, September 14, 2020 8:47 AM
To: 'Dave Shaw'
Subject: RE: Field Report Permit 63-32366

Hello Dave,

Thank you for your email. I will move forward to submit a draft amendment and my review to my supervisor.

Your question regarding ponds is a common question for ponds intercepting shallow ground water. We always list the legal description for each tract of land the ponds are located in for the place of use. You did this correctly in your field report.

For the points of diversion, we try to place the point of diversion in the center of the pond, since that is generally the deepest part of the pond. This can be subjective when a pond is found in two or more tracts like Pond #2 in your field report. We can only allow one point of diversion per pond, so it becomes a matter of where best to place the point of diversion for these types of ponds. When I looked at Pond #2 in your field report, I found the majority of the pond in the NESW, and the center of pond was also in the NESW, so I chose that location. If you had found that the deepest part of Pond #2 was in the NWSW, I wouldn't have disagreed with you if you wanted the point of diversion in the NWSW.

When we have situations where a legal description or location of a place of use or point of diversion are a matter of interpretation, we generally go with what the person that was at the site determined. I have had a situation where a field examiner tried to include a point of diversion for each tract where a pond was located, which resulted in more points of diversions than there were ponds. We asked that field examiner to choose a single point of diversion description for each pond. As long as there is only one point of diversion per pond, we generally go with what the field examiner feels is reasonable.

Thank you for question. Ponds are always difficult and can be confusing. Over the years things have changed from time to time regarding ponds, and it is difficult to maintain a guidance document that deals with all of the issues regarding ponds. We have recently made sure all of our guidance documents are available to the public. Below is the location of all of our guidance documents:

Statutes = <https://legislature.idaho.gov/statutesrules/idstat/Title42/>

Administrative IDAPA Rules = <https://adminrules.idaho.gov/rules/current/37/>

Administrative Memorandums = <https://idwr.idaho.gov/legal-actions/guidance-documents/non-administrative.html>

I hope the above information helps.

Respectfully,

Daniel Nelson
Water Right Analyst 3
Idaho Department of Water Resources
Telephone (208) 287-4856
Fax (208) 287-6700 (attn: Dan Nelson)

From: Dave Shaw [mailto:dshaw@eroresources.com]
Sent: Friday, September 11, 2020 3:46 PM
To: Nelson, Dan <Dan.Nelson@idwr.idaho.gov>
Subject: RE: Field Report Permit 63-32366

Hi Dan,

I am fine with your recommendations for points of diversion, it has never been clear to me how pond PODs are described so I was overly inclusive but neglected to include the additional sheet when the Field Report was resubmitted. Your proposed recommendations are fine with me. For my own edification, are place of use descriptions for ponds all inclusive so Pond 1 for example would have POU in both lots 6 and 7?

The transfer for aesthetic storage from Thurman Mill and Warm Springs seem to have been a challenge for IDWR. Transfers 77545 and 79654 I believe are the most recent transfers for these rights and in addition to putting the wrong volume in permit 63-32366 the Thurman Mill aesthetic storage for Lakemoor was inadvertently omitted. I agree the aesthetic storage (mitigation) should be 64.6 AF as the total of 40.7 AF from Warm Springs and 23.9 AF from Thurman Mill.

Thanks for your help Dan,
Dave

David Shaw

ERO Resources Corporation

208.365.7684 dshaw@eroresources.com | www.eroresources.com

From: Nelson, Dan <Dan.Nelson@idwr.idaho.gov>
Sent: Friday, September 11, 2020 11:35 AM
To: Dave Shaw <dshaw@eroresources.com>
Subject: Field Report Permit 63-32366

Hello Dave,

I have finished my review of the field report you sent for permit 63-32366. I found two issues that should be addressed before I turn in the field report.

The first issue deals with the point of diversion descriptions. In the first field report you submitted, you included all of the legal descriptions for the ponds as the points of diversion. On you second field report, you only recommended 4 points of diversion. It appears as though you may have neglected to send in the alternate page with the additional points of diversion. Typically, we have a single point of diversion in the middle of each pond, so either submittal would have raised a concern. I have a put together a point of diversion table and map below showing my interpretation of how I feel the points of diversion should be listed. Please review the table and maps an let me know if you agree. If you don't agree, please provide a table and map with your interpretation of how the points of diversion should be listed in the upcoming amendment and potential license.

1. LOCATION OF POINT(S) OF DIVERSION:

Source	Govt. Lot	¼	¼	¼	Sec.	Twp.	Rge.		County
Pond #1	6		SE	NW	21	4N	1E	B.M.	ADA

Pond #2			NE	SW	21	4N	1E	B.M.	ADA
Pond #3	5		SW	NW	21	4N	1E	B.M.	ADA
Pond #4	5		SW	NW	21	4N	1E	B.M.	ADA
Pond #5			NW	SW	21	4N	1E	B.M.	ADA
Pond #6			NE	SW	21	4N	1E	B.M.	ADA
Pond #7			NE	SW	21	4N	1E	B.M.	ADA
Pond #8			NE	SW	21	4N	1E	B.M.	ADA
Pond #9			NE	SW	21	4N	1E	B.M.	ADA
Pond #10	5		SW	NW	21	4N	1E	B.M.	ADA
Pond #11			NW	SW	21	4N	1E	B.M.	ADA
Pond #12			NW	SW	21	4N	1E	B.M.	ADA



The second issue has to do with condition 8 on the permit. Please read the following analysis of transfers and the evaporation losses for the ponds that will be included in my review memorandum for the licensing of this permit. It really doesn't affect the end result of the license or the permit, but it is different than what was actually permitted originally. You don't need to address this issue at this time, but I wanted to make you aware of my analysis when you see the change to the condition in the licensing amendment. If you file a water right transfer to change the difference back to irrigation, you will need to know the information provided below.

The permit has a condition that limits the total volume for evaporation to 78.5 af from transfers 73900 and 73930, but that amount does not accurately reflect water right transfers 73900 and 73930. Water right transfers 73900 and 7930 were filed to cover the evaporation from the ponds associated with this permit (63-32366). Water right transfer **70620** provided 37.8 af from the Warm Springs Ditch Company water rights 63-192, 63-216C, and 63-19425 for ponds developed by water right **63-31690** in a subdivision across the road to the west that was developed by the same company. Water right transfer 73930 was filed to supply 40.7 af from the Warm Springs Ditch Company water rights 63-192, 63-216C, and 63-19425 for ponds developed by same company for the ponds developed by this permit 63-32366. Water right transfers **70620** and 73930 do have a combined total of 78.5 af of water from the Warm Springs Ditch Company water rights 63-192, 63-216C, and

63-19425, but the two transfers are for two separate subdivisions. Water right transfer 73900 and permit 63-32366 are in no way connected to water right **63-31690**, the subdivision across the road, or transfer **70620**.

Transfer 73930 authorizes 0.23 cfs and 40.7 af from the Warm Springs Ditch Company water rights 63-192, 63-216C, and 63-1963-3266425 to provide evaporation losses for this permit (63-32366). Transfer 73900 authorizes 0.16 cfs and 23.9 af from the Thurman Mill Ditch Company water right 63-250 to provide evaporation losses for this permit (63-32366). These two transfers allows a total of 0.39 cfs and 64.6 af of water for evaporation and storage for this permit. Therefore, the following condition will need to replace the condition on the permit:

Per Transfer 73900, Right 63-250 authorizes the diversion of 0.16 cfs and 23.9 af and Transfer 73930, Rights 63-192, 63-216C, and 63-19425 authorizes the diversion of 0.23 cfs and 40.7 af for a total of 0.39 cfs and 64.6 af of water to storage to offset evaporation and seepage losses from the ponds authorized by this right.

The total mitigation needed for evaporation losses according the Kuna (NWS – USC00105038) ET Station should be 60.1 af, so the actual evaporation losses are still within the amounts approved through transfers 73900 and 73930.

Once we have addressed the points of diversion, we can move forward with the amendment and licensing portion of this permit. I also hope the clarification of transfers 76900 and 73930 will be helpful to you in the future as needed.

Respectfully,

Daniel Nelson
Water Right Analyst 3
Idaho Department of Water Resources
Telephone (208) 287-4856
Fax (208) 287-6700 (attn: Dan Nelson)

Nelson, Dan

From: Nelson, Dan
Sent: Thursday, September 10, 2020 7:01 AM
To: 'Dave Shaw'
Subject: RE: Evaporation for Permit 63-32366

Dave,

Sounds good to me. I will use the Kuna Station, since it will give the full evaporation rates.

Dan

From: Dave Shaw [mailto:dshaw@eroresources.com]
Sent: Wednesday, September 09, 2020 7:17 PM
To: Nelson, Dan <Dan.Nelson@idwr.idaho.gov>
Subject: RE: Evaporation for Permit 63-32366

Dan,

Using Kuna or Boise as the basis for pond evaporation is fine with me since there is more than enough mitigation water available.

Thank you for your help,
Dave

David Shaw

ERO Resources Corporation

208.365.7684 dshaw@eroresources.com | www.eroresources.com

From: Nelson, Dan <Dan.Nelson@idwr.idaho.gov>
Sent: Wednesday, September 9, 2020 3:52 PM
To: Dave Shaw <dshaw@eroresources.com>
Subject: Evaporation for Permit 63-32366

Hello Dave,

I have done a quick review of the additional information you supplied for permit 63-32366. Unless you want me to change the evaporation volume you calculated, **I can and will use the evaporation rate of 47.9 af you supplied**, since it is in-between the annual volume from the Emmett station and the Boise Airport station.

When I looked at the surrounding stations, I wanted to make sure that you wanted to reduce the evaporation volume by that much. Where the subdivision is on the Boise side of the foothills, I would be more inclined to go with a much higher evaporation rate to ensure that the evaporation from the ponds is fully covered. With the ability to recommend up to 78.5 af of evaporation from the permit, I would be more inclined to go with the Kuna or Boise Airport numbers.

I have included the map below that shows the different ET station shapes that we use, and due to the location of the ponds, I can go with any number between 44.9 af to 60.1 af of annual evaporation losses. I have also attached the worksheets with the ET data that I used to attain volumes shown on the map below. I used the

surface area of the ponds in your field report of 19.8 af. I also used the Small, Shallow Stock Ponds ET values from the University of Idaho Kimberley Research and Extension Center ETIdaho webpage (<http://data.kimberly.uidaho.edu/ETIdaho/>), since most of the ponds are under 13.1 feet average depth.

As I stated earlier, I can and will proceed with the 47.9 af you calculated, unless you want me to change to one of these other stations. I just wanted to give you a chance to see what I am seeing with the data that I have to work with, and give you an opportunity to take a second look at the numbers if you wish. I am going to continue to process this application without any further delay, and I am hoping to turn it in for final review by the end of this week.

Respectfully,

Daniel Nelson
Water Right Analyst 3
Idaho Department of Water Resources
Telephone (208) 287-4856
Fax (208) 287-6700 (attn: Dan Nelson)

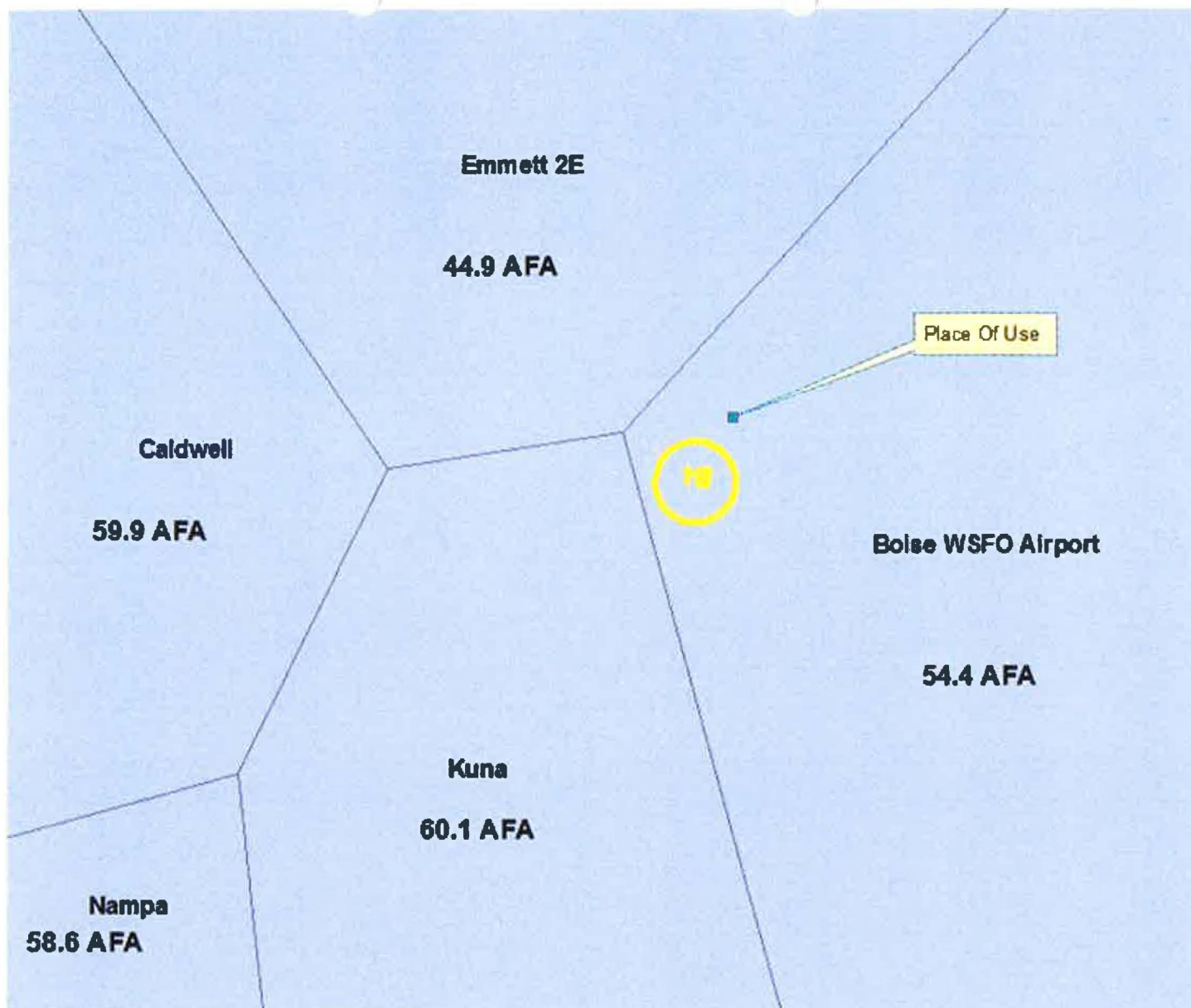


Exhibit E - Low Management Pasture Evaporation

Evaporation Loss Calculations

This spreadsheet has been designed by Idaho Department of Water Resources to estimate the annual evaporation losses from a pond.

FILE NUMBER	63-32366
REVIEWER	DBS
DATE	8/20/2020

User Input
Calculated value
Formula Explanations

The acronyms used on the Kimberly Research Center website are defined below:
P = Precipitation
ET= Evapotranspiration
P _d = Precipitation deficit
P _d =ET-P

USING THIS SPREADSHEET

Use the link below to access the Kimberly Research Center website. This website provides the Precipitation Deficit for a station most representative of the pond under examination. The Precipitation Deficit is the total amount of free water surface evaporation minus the precipitation for a given area, which gives the total amount of evaporative losses incurred by the pond. There are several weather sites that are used throughout the state. IDWR staff can find the nearest site using Arc Map. The shape file containing the sites can be found at <X:/Spatial/Climate/ETIdahostations.shp>.

Instructions:

1. Use the link below to navigate to ET Idaho 2012.
2. Select the station which is most representative to your pond location.
3. Click Submit Query.
4. Under "Land Covers with Evapotranspiration Estimates," select "Open Water - Shallow Systems (ponds, streams)" or "Open Water - small stock ponds" depending on the pond size.
5. Click the link to "Precipitation Deficit."
6. Reference and copy (ctrl + C) the first subheading "Mean" values.
7. Click the "Paste Values from ET Idaho" button. The table will automatically enter a zero (0) for any negative precipitation deficit values.

Found at: <http://data.kimberly.uidaho.edu/ETIdaho/>

Precipitation Deficit

Station: Boise WSFO Airport

Month	mm/day ¹	Days per month	mm/Month
Jan	-0.13	31	0.00
Feb	0.08	28	2.15
March	0.62	31	19.32
April	2.55	30	76.40
May	3.56	31	110.36
June	4.61	30	138.20
July	5.12	31	158.82
August	4.10	31	127.20
September	2.31	30	69.30
October	0.92	31	28.62
November	-0.27	30	0.00
December	-0.43	31	0.00

Total mm/year =	730.38
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PLEASE NOTE: The seasonal average for precipitation deficit should not be used for calculations because precipitation often exceeds evaporation during wetter months of the year. If the pond is kept full, excess precipitation during wetter months does not serve to refill the pond during drier months.

For example, see Sandpoint KSPT (NWS -- 108137), the annual precipitation deficit is -106 mm. However, April through September have positive precipitation deficit values. To properly estimate the annual volume of water necessary to refill a pond due to evaporation losses, the table will automatically enter a zero (0) for each month that the precipitation value is reported as a negative value.

As described above, precipitation offsets evaporation in winter months, so the net effect is that wintertime precipitation deficit is usually zero.

$$\left(\frac{730.38}{304.8} \right) \times 20.00 = 47.9 \text{ AFA}$$

Evaporation Loss Calculations

This spreadsheet has been designed by Idaho Department of Water Resources to estimate the annual evaporation losses from a pond.

FILE NUMBER	63-12601
REVIEWER	Dan Nelson
DATE	5/9/2018

User Input
Calculated value
Formula Explanations

The acronyms used on the Kimberly Research Center website are defined below:

P = Precipitation
ET= Evapotranspiration
P _d = Precipitation deficit
P _d =ET-P

USING THIS SPREADSHEET

Use the link below to access the Kimberly Research Center website. This website provides the Precipitation Deficit for a station most representative of the pond under examination. The Precipitation Deficit is the total amount of free water surface evaporation minus the precipitation for a given area, which gives the total amount of evaporative losses incurred by the pond. There are several weather sites that are used throughout the state. IDWR staff can find the nearest site using Arc Map. The shape file containing the sites can be found at X:/Spatial/Climate/ETIdahostations.shp.

Instructions:

1. Use the link below to navigate to ET Idaho 2012.
2. Select the station which is most representative to your pond location.
3. Click Submit Query.
4. Under "Land Covers with Evapotranspiration Estimates," select "Open Water - Shallow Systems (ponds, streams)" or "Open Water - small stock ponds" depending on the pond size.
5. Click the link to "Precipitation Deficit."
6. Reference and copy (ctrl + C) the first subheading "Mean" values.
7. Click the "Paste Values from ET Idaho" button. The table will automatically enter a zero (0) for any negative precipitation deficit values.

Found at: <http://data.kimberly.uidaho.edu/ETIdaho/>

Precipitation Deficit

Station: Nampa (PN-AM--NMPI)

Month	mm/day ¹	Days per month	mm/Month
Jan	-0.11	31	0.00
Feb	0.66	28	18.48
March	1.94	31	60.14
April	2.78	30	83.40
May	3.54	31	109.74
June	4.66	30	139.80
July	5.66	31	175.46
August	4.83	31	149.73
September	3.18	30	95.40
October	1.75	31	54.25
November	0.53	30	15.90
December	-0.20	31	0.00

PLEASE NOTE: The seasonal average for precipitation deficit should not be used for calculations because precipitation often exceeds evaporation during wetter months of the year. If the pond is kept full, excess precipitation during wetter months does not serve to refill the pond during drier months.

For example, see Sandpoint KSPT (NWS -- 108137), the annual precipitation deficit is -106 mm. However, April through September have positive precipitation deficit values. To properly estimate the annual volume of water necessary to refill a pond due to evaporation losses, the table will automatically enter a zero (0) for each month that the precipitation value is reported as a negative value.

As described above, precipitation offsets evaporation in winter months, so the net effect is that wintertime precipitation deficit is usually zero.

Total mm/year = 902.30

$[(\text{mm/yr}) \div (\text{convert to feet})] \times (\text{Surface area of pond, in acres}) = \text{Evaporation Loss in Acre Feet}$

$$(902.30 \div 304.8) \times 19.80 = 58.6 \text{ AFA}$$



University of Idaho

Kimberly Research
and Extension Center

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ETIdaho 2017

Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho

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uidaho dot edu

2020-09-09 14:15

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Nampa (PN-AM -- NMPI)

Statistics based on thirty year normal spans 1997 to 2016 years

For a different land cover or crop click on the above link.

You can highlight this table and copy via the clipboard to a Microsoft Excel or OpenOffice spreadsheet to plot or otherwise work with this data.

Open water - small stock ponds Precipitation Deficit (Click here for a graph)															
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Growing Season ^a	Non Growing Season ^b	Annual
Mean ⁱ	mm/day												mm		
Monthly ^c	-0.11	0.66	1.94	2.78	3.54	4.66	5.66	4.83	3.18	1.75	0.53	-0.20	893	0	893
15-Day Moving Average ^d	-0.11	0.61	2.00	2.85	3.57	4.71	5.66	4.86	3.18	1.71	0.54	-0.23			
7-Day Moving Average ^e	-0.10	0.65	1.95	2.79	3.52	4.67	5.66	4.83	3.16	1.74	0.53	-0.23			
3-Day Moving Average ^f	-0.11	0.66	1.94	2.77	3.52	4.65	5.67	4.83	3.16	1.74	0.53	-0.20			

Evaporation Loss Calculations

This spreadsheet has been designed by Idaho Department of Water Resources to estimate the annual evaporation losses from a pond.

FILE NUMBER	63-12601
REVIEWER	Dan Nelson
DATE	5/9/2018

User Input
Calculated value
Formula Explanations

The acronyms used on the Kimberly Research Center website are defined below:

P = Precipitation
ET= Evapotranspiration
P _d = Precipitation deficit
P _d =ET-P

USING THIS SPREADSHEET

Use the link below to access the Kimberly Research Center website. This website provides the Precipitation Deficit for a station most representative of the pond under examination. The Precipitation Deficit is the total amount of free water surface evaporation minus the precipitation for a given area, which gives the total amount of evaporative losses incurred by the pond. There are several weather sites that are used throughout the state. IDWR staff can find the nearest site using Arc Map. The shape file containing the sites can be found at X:/Spatial/Climate/ETIdahostations.shp.

Instructions:

1. Use the link below to navigate to ET Idaho 2012.
2. Select the station which is most representative to your pond location.
3. Click Submit Query.
4. Under "Land Covers with Evapotranspiration Estimates," select "Open Water - Shallow Systems (ponds, streams)" or "Open Water - small stock ponds" depending on the pond size.
5. Click the link to "Precipitation Deficit."
6. Reference and copy (ctrl + C) the first subheading "Mean" values.
7. Click the "Paste Values from ET Idaho" button. The table will automatically enter a zero (0) for any negative precipitation deficit values.

Found at: <http://data.kimberly.uidaho.edu/ETIdaho/>

Precipitation Deficit

Station: Kuna (NWS--USC00105038)

Month	mm/day ¹	Days per month	mm/Month
Jan	-0.41	31	0.00
Feb	0.55	28	15.40
March	1.83	31	56.73
April	3.18	30	95.40
May	4.04	31	125.24
June	4.97	30	149.10
July	5.54	31	171.74
August	4.58	31	141.98
September	3.25	30	97.50
October	2.19	31	67.89
November	0.14	30	4.20
December	-0.21	31	0.00

Total mm/year = 925.18

PLEASE NOTE: The seasonal average for precipitation deficit should not be used for calculations because precipitation often exceeds evaporation during wetter months of the year. If the pond is kept full, excess precipitation during wetter months does not serve to refill the pond during drier months.

For example, see Sandpoint KSPT (NWS -- 108137), the annual precipitation deficit is -106 mm. However, April through September have positive precipitation deficit values. To properly estimate the annual volume of water necessary to refill a pond due to evaporation losses, the table will automatically enter a zero (0) for each month that the precipitation value is reported as a negative value.

As described above, precipitation offsets evaporation in winter months, so the net effect is that wintertime precipitation deficit is usually zero.

$[(\text{mm/yr}) \div (\text{convert to feet})] \times (\text{Surface area of pond, in acres}) = \text{Evaporation Loss in Acre Feet}$

$$\left(\frac{925.18}{304.8} \right) \times 19.80 = 60.1 \text{ AFA}$$



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ETIdaho 2017

Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho

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Kuna (NWS -- USC00105038)

Statistics based on thirty year normal spans 1959 to 1995 years

For a different land cover or crop click on the above link.

You can highlight this table and copy via the clipboard to a Microsoft Excel or OpenOffice spreadsheet to plot or otherwise work with this data.

Open water - small stock ponds Precipitation Deficit (Click here for a graph)															
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Growing Season ^a	Non Growing Season ^b	Annual
Mean ^j	mm/day												mm		
Monthly ^c	-0.41	0.55	1.83	3.18	4.04	4.97	5.54	4.58	3.25	2.19	0.14	-0.21	908	0	908
15-Day Moving Average ^d	-0.45	0.40	1.77	3.20	4.07	5.05	5.57	4.49	3.16	2.15	0.10	-0.27			
7-Day Moving Average ^e	-0.42	0.49	1.81	3.18	4.02	4.97	5.57	4.55	3.20	2.15	0.06	-0.24			
3-Day Moving Average ^f	-0.40	0.55	1.83	3.19	4.03	4.97	5.55	4.58	3.23	2.18	0.10	-0.22			

Evaporation Loss Calculations

This spreadsheet has been designed by Idaho Department of Water Resources to estimate the annual evaporation losses from a pond.

FILE NUMBER	63-12601
REVIEWER	Dan Nelson
DATE	5/9/2018

User Input
Calculated value
Formula Explanations

The acronyms used on the Kimberly Research Center website are defined below:

P = Precipitation
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P _d = Precipitation deficit
P _d =ET-P

USING THIS SPREADSHEET

Use the link below to access the Kimberly Research Center website. This website provides the Precipitation Deficit for a station most representative of the pond under examination. The Precipitation Deficit is the total amount of free water surface evaporation minus the precipitation for a given area, which gives the total amount of evaporative losses incurred by the pond. There are several weather sites that are used throughout the state. IDWR staff can find the nearest site using Arc Map. The shape file containing the sites can be found at X:/Spatial/Climate/ETIdahostations.shp.

Instructions:

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2. Select the station which is most representative to your pond location.
3. Click Submit Query.
4. Under "Land Covers with Evapotranspiration Estimates," select "Open Water - Shallow Systems (ponds, streams)" or "Open Water - small stock ponds" depending on the pond size.
5. Click the link to "Precipitation Deficit."
6. Reference and copy (ctrl + C) the first subheading "Mean" values.
7. Click the "Paste Values from ET Idaho" button. The table will automatically enter a zero (0) for any negative precipitation deficit values.

Found at: <http://data.kimberly.uidaho.edu/ETIdaho/>

Precipitation Deficit

Station: Emmett 2E (NWS -- USC001029420)

Month	mm/day ¹	Days per month	mm/Month
Jan	-0.85	31	0.00
Feb	-0.31	28	0.00
March	0.78	31	24.18
April	2.29	30	68.70
May	3.04	31	94.24
June	3.98	30	119.40
July	4.66	31	144.46
August	4.06	31	125.86
September	2.57	30	77.10
October	1.22	31	37.82
November	-0.64	30	0.00
December	-1.46	31	0.00

PLEASE NOTE: The seasonal average for precipitation deficit should not be used for calculations because precipitation often exceeds evaporation during wetter months of the year. If the pond is kept full, excess precipitation during wetter months does not serve to refill the pond during drier months.

For example, see Sandpoint KSPT (NWS -- 108137), the annual precipitation deficit is -106 mm. However, April through September have positive precipitation deficit values. To properly estimate the annual volume of water necessary to refill a pond due to evaporation losses, the table will automatically enter a zero (0) for each month that the precipitation value is reported as a negative value.

As described above, precipitation offsets evaporation in winter months, so the net effect is that wintertime precipitation deficit is usually zero.

Total mm/year = 691.76

$$[(691.76 \text{ mm/yr}) \div (\text{convert to feet})] \times (\text{Surface area of pond, in acres}) = \text{Evaporation Loss in Acre Feet}$$

$$(691.76 \div 304.8) \times 19.80 = 44.9 \text{ AFA}$$



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ETIdaho 2017

Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho

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2020-09-09 14:06

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Idaho.

Emmett 2E (NWS -- USC00102942)

Statistics based on thirty year normal spans 1980 to 2015 years

For a different land cover or crop click on the above link.

You can highlight this table and copy via the clipboard to a Microsoft Excel or OpenOffice spreadsheet to plot or otherwise work with this data.

Open water - small stock ponds Precipitation Deficit (Click here for a graph)															
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Growing Season ^a	Non Growing Season ^b	Annual
Mean ⁱ	mm/day												mm		
Monthly ^c	-0.85	-0.31	0.78	2.29	3.04	3.98	4.66	4.06	2.57	1.22	-0.64	-1.46	592	0	592
15-Day Moving Average ^d	-0.87	-0.49	0.78	2.32	2.99	4.08	4.71	4.03	2.48	1.27	-0.65	-1.46			
7-Day Moving Average ^e	-0.88	-0.40	0.80	2.29	3.01	4.05	4.69	4.05	2.52	1.23	-0.67	-1.46			
3-Day Moving Average ^f	-0.87	-0.32	0.79	2.30	3.03	4.00	4.67	4.06	2.56	1.22	-0.63	-1.46			
	mm/day												mm		

Evaporation Loss Calculations

This spreadsheet has been designed by Idaho Department of Water Resources to estimate the annual evaporation losses from a pond.

FILE NUMBER	63-12601
REVIEWER	Dan Nelson
DATE	5/9/2018

User Input
Calculated value
Formula Explanations

The acronyms used on the Kimberly Research Center website are defined below:

P = Precipitation
ET= Evapotranspiration
P _d = Precipitation deficit
P _d =ET-P

USING THIS SPREADSHEET

Use the link below to access the Kimberly Research Center website. This website provides the Precipitation Deficit for a station most representative of the pond under examination. The Precipitation Deficit is the total amount of free water surface evaporation minus the precipitation for a given area, which gives the total amount of evaporative losses incurred by the pond. There are several weather sites that are used throughout the state. IDWR staff can find the nearest site using Arc Map. The shape file containing the sites can be found at X:/Spatial/Climate/ETIdahostations.shp.

Instructions:

1. Use the link below to navigate to ET Idaho 2012.
2. Select the station which is most representative to your pond location.
3. Click Submit Query.
4. Under "Land Covers with Evapotranspiration Estimates," select "Open Water - Shallow Systems (ponds, streams)" or "Open Water - small stock ponds" depending on the pond size.
5. Click the link to "Precipitation Deficit."
6. Reference and copy (ctrl + C) the first subheading "Mean" values.
7. Click the "Paste Values from ET Idaho" button. The table will automatically enter a zero (0) for any negative precipitation deficit values.

Found at: <http://data.kimberly.uidaho.edu/ETIdaho/>

Precipitation Deficit

Station: Boise WSFO Airport (NWS -- USC00101022)

Month	mm/day ¹	Days per month	mm/Month
Jan	-0.55	31	0.00
Feb	0.27	28	7.56
March	1.16	31	35.96
April	2.58	30	77.40
May	3.41	31	105.71
June	4.89	30	146.70
July	5.49	31	170.19
August	4.64	31	143.84
September	3.17	30	95.10
October	1.76	31	54.56
November	-0.06	30	0.00
December	-0.71	31	0.00

PLEASE NOTE: The seasonal average for precipitation deficit should not be used for calculations because precipitation often exceeds evaporation during wetter months of the year. If the pond is kept full, excess precipitation during wetter months does not serve to refill the pond during drier months.

For example, see Sandpoint KSPT (NWS -- 108137), the annual precipitation deficit is -106 mm. However, April through September have positive precipitation deficit values. To properly estimate the annual volume of water necessary to refill a pond due to evaporation losses, the table will automatically enter a zero (0) for each month that the precipitation value is reported as a negative value.

As described above, precipitation offsets evaporation in winter months, so the net effect is that wintertime precipitation deficit is usually zero.

Total mm/year = 837.02

$[(\text{mm/yr}) \div (\text{convert to feet})] \times (\text{Surface area of pond, in acres}) = \text{Evaporation Loss in Acre Feet}$

(837.02 ÷ 304.8) X 19.80 = 54.4 AFA



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[Water Resources Program](#)

ETIdaho 2017

**Evapotranspiration and Consumptive
Irrigation Water Requirements
for Idaho**

Please send suggestions for
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2020-09-09 14:50

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Boise WSFO Airport (NWS -- USC00101022)

Statistics based on thirty year normal spans 1986 to 2016 years

For a different land cover or crop click on the above link.

You can highlight this table and copy via the clipboard to a Microsoft Excel or OpenOffice spreadsheet to plot or otherwise work with this data.

Open water - small stock ponds Precipitation Deficit (Click here for a graph)															
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Growing Season ^a	Non Growing Season ^b	Annual
Mean ^j	mm/day												mm		
Monthly ^c	-0.55	0.27	1.16	2.58	3.41	4.89	5.49	4.64	3.17	1.76	-0.06	-0.71	797	0	796
15-Day Moving Average ^d	-0.59	0.10	1.17	2.57	3.46	4.88	5.52	4.64	3.12	1.79	-0.06	-0.65			
7-Day Moving Average ^e	-0.58	0.17	1.16	2.54	3.42	4.89	5.49	4.63	3.13	1.77	-0.07	-0.70			
3-Day Moving Average ^f	-0.56	0.24	1.15	2.57	3.40	4.90	5.49	4.64	3.14	1.75	-0.05	-0.72			

Evaporation Loss Calculations

This spreadsheet has been designed by Idaho Department of Water Resources to estimate the annual evaporation losses from a pond.

FILE NUMBER	63-12601
REVIEWER	Dan Nelson
DATE	5/9/2018

User Input
Calculated value
Formula Explanations

The acronyms used on the Kimberly Research Center website are defined below:

P = Precipitation
ET= Evapotranspiration
P _d = Precipitation deficit
P _d =ET-P

USING THIS SPREADSHEET

Use the link below to access the Kimberly Research Center website. This website provides the Precipitation Deficit for a station most representative of the pond under examination. The Precipitation Deficit is the total amount of free water surface evaporation minus the precipitation for a given area, which gives the total amount of evaporative losses incurred by the pond. There are several weather sites that are used throughout the state. IDWR staff can find the nearest site using Arc Map. The shape file containing the sites can be found at X:/Spatial/Climate/ETIdahostations.shp.

Instructions:

1. Use the link below to navigate to ET Idaho 2012.
2. Select the station which is most representative to your pond location.
3. Click Submit Query.
4. Under "Land Covers with Evapotranspiration Estimates," select "Open Water - Shallow Systems (ponds, streams)" or "Open Water - small stock ponds" depending on the pond size.
5. Click the link to "Precipitation Deficit."
6. Reference and copy (ctrl + C) the first subheading "Mean" values.
7. Click the "Paste Values from ET Idaho" button. The table will automatically enter a zero (0) for any negative precipitation deficit values.

Found at: <http://data.kimberly.uidaho.edu/ETIdaho/>

Precipitation Deficit

Station: Caldwell (NWS--USC00101380)

Month	mm/day ¹	Days per month	mm/Month
Jan	-0.76	31	0.00
Feb	0.30	28	8.40
March	1.53	31	47.43
April	3.12	30	93.60
May	4.41	31	136.71
June	5.04	30	151.20
July	5.57	31	172.67
August	4.69	31	145.39
September	3.34	30	100.20
October	2.08	31	64.48
November	0.06	30	1.80
December	-0.67	31	0.00

PLEASE NOTE: The seasonal average for precipitation deficit should not be used for calculations because precipitation often exceeds evaporation during wetter months of the year. If the pond is kept full, excess precipitation during wetter months does not serve to refill the pond during drier months.

For example, see Sandpoint KSPT (NWS -- 108137), the annual precipitation deficit is -106 mm. However, April through September have positive precipitation deficit values. To properly estimate the annual volume of water necessary to refill a pond due to evaporation losses, the table will automatically enter a zero (0) for each month that the precipitation value is reported as a negative value.

As described above, precipitation offsets evaporation in winter months, so the net effect is that wintertime precipitation deficit is usually zero.

Total mm/year = 921.88

$$((921.88) \div (304.8)) \times 19.80 = 59.9 \text{ AFA}$$



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ETIdaho 2017

Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho

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Caldwell (NWS -- USC00101380)

Statistics based on thirty year normal spans 1964 to 1997 years

For a different land cover or crop click on the above link.

You can highlight this table and copy via the clipboard to a Microsoft Excel or OpenOffice spreadsheet to plot or otherwise work with this data.

Open water - small stock ponds Precipitation Deficit (Click here for a graph)															
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Growing Season ^a	Non Growing Season ^b	Annual
Mean ^j	mm/day												mm		
Monthly ^c	-0.76	0.30	1.53	3.12	4.41	5.04	5.57	4.69	3.34	2.08	0.06	-0.67	892	0	892
15-Day Moving Average ^d	-0.82	0.08	1.45	3.18	4.49	5.10	5.61	4.59	3.24	2.07	0.13	-0.64			
7-Day Moving Average ^e	-0.80	0.21	1.50	3.13	4.43	5.05	5.61	4.66	3.26	2.07	0.07	-0.67			
3-Day Moving Average ^f	-0.76	0.28	1.53	3.13	4.42	5.04	5.58	4.69	3.31	2.07	0.09	-0.67			