Overview

1. Overview of the ECO-PTM Installation

2. ECO-PTM input files

3. Hands-on exercises: Run a simulation for each particle type:

np Studies	**N**eutrally-Buoyant **P**article studies (delta smelt larvae)
pp Studies	**P**osition-Oriented **P**article studies (longfin smelt larvae)
sp Studies	**S**almon **P**article studies (chinook salmon smolts)

Overview of the DSM2 Installation

Folders in dsm2 folder

- bin\:   dsm2 executables
- common_input\:   shared dsm2 input files
- documentation\:   dsm2 documentation
- extras\:   software you may find useful
- scripts\:   vscript scripts for input/output processing
- studies\:   create your studies here
- study_templates\: Copy these folders to create new studies
- timeseries\:   shared dss timeseries input data
- tutorials\:   dsm2 tutorials
- vista\:   the DSM2 Vista application

Legend

| Folders we will modify |
| Folders we will not modify |

Overview of the DSM2 Installation

The historical_ECO-PTM folder

Folders in studies/historical_ECO-PTM folder

- studies\:   create your studies here
  - historical_ECO-PTM\:   The ECO-PTM historical study folder
    - np\   neutrally-buoyant particles
    - pp\   position-oriented particles
    - sp\   salmon particles

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ECO-PTM Glossary

Term	Definition
DSM2	Delta Simulation Model 2
Environment variable	Operating system level variable, used by DSM2 to store some of its model configuration information
Tidefile	A binary file (.h5) containing hydrodynamics output from the DSM2 Hydro model. Used as input to DSM2 Qual and ECO-PTM models
NP	Neutrally-Buoyant particle, typically used to represent delta smelt larvae
PP	Position-Oriented particle, typically used to represent longfin smelt larvae
SP	Salmon particle, typically used to represent chinook salmon smolts

ECO-PTM Input Files

ptm.inp: CONFIGURATION, SCALAR, IO_FILE, TIDEFILE
same for all study types

Input and output
file specifications

Uses environment
variable to specify
path to input
tidefile

```
CONFIGURATION
config.inp
END


SCALAR
NAME          VALUE
END


IO_FILE
MODEL     TYPE     IO     INTERVAL     FILE
ptm      trace    out    none         ${DSM2OUTPUTDIR}/trace.out    # Trace output file. This file is necessary to calculate the
number of particles.
ptm      output   out    none         ${PTMOUTFILE}           #Echoed run status
ptm      echo     out    none         ${DSM2OUTPUTDIR}/ptm_echo_${DSM2MODIFIER}.inp #Echoed input
ptm      behavior in     none         "ptm_behavior_inputs.inp"
END


TIDEFILE
START_DATE    END_DATE     FILE
runtime       length       ${HYDROTIDEFILE}        # Hydrodynamics file from DSM2 hydro.  This file provides grid information
as well.
END
```

ECO-PTM Input Files

config.inp: same for all particle types

Start and end date
of simulation

Path to tidefile
(output from
DSM2-hydro)

```
ENVVAR
NAME                 VALUE
DSM2MODIFIER         hist_v822           #Study name used for DSM2 output
PTM_START_DATE          08Mar2012  #01JAN2007
END_DATE            15Aug2012           #01MAR2007
END_TIME            0000
TEMPDIR             N/A
#Input envvars
STUDYDIR                 .
TSINPUTDIR          N/A
#Output
DSM2OUTPUTDIR            ${STUDYDIR}/output
DSM2SHAREDDIR            ../tidefile
OUTPUTFILE          N/A
#Hydro
HYDROTIDEFILE           ${DSM2SHAREDDIR}/${DSM2MODIFIER}.h5
#PTM
PTMOUTFILE          ${DSM2OUTPUTDIR}/${DSM2MODIFIER}.pof
#PTMOUTPUTFILE           ${DSM2OUTPUTDIR}/ptmout.txt
PTMOUTPUTFILE           ${DSM2OUTPUTDIR}/ptmout.dss
END
```

Particle Flux Output

Cumulative percentage of all particles in system passing each location
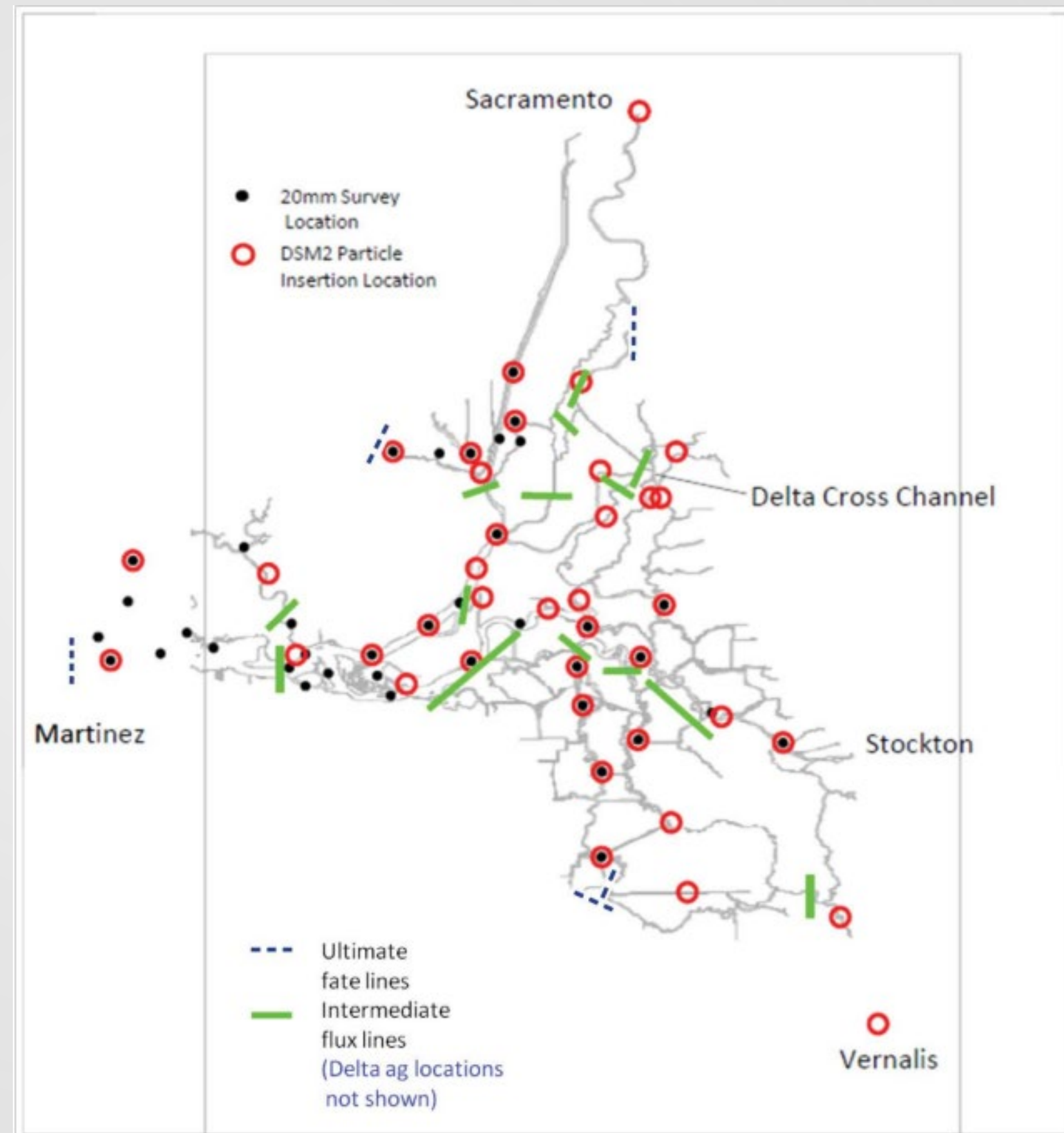
ECO-PTM Input Files

ptm.inp: Particle Group Output: same for all particle types

Particle Group Output: Number of particles passing through a location during each time interval

GROUP
NAME
SUT
STM
GS
RIO_UP
RIO
chipps_east
chipps_west
ag_div
swp
cvp
mtz
franks
whole
END

GROUP_MEMBER		
GROUP_NAME	MEMBER_TYPE	PATTERN
SUT	channel	(379)
STM	channel	(383)
GS	channel	(366)
RIO_UP	channel	(387|398|429)
RIO	channel	(430)
chipps_east	channel	(288|294|291)
chipps_west	channel	(442|437)
ag_div	qext	dicu_div_.*
ag_div	qext	bbid.*
swp	qext	swp
cvp	qext	cvp
mtz	stage	mtz.*
franks	reservoir	franks_tract
whole	channel	.*
whole	reservoir	.*
END		

PARTICLE_GROUP_OUTPUT			
NAME	GROUP_NAME	INTERVAL	FILE
GS	GS	15min	${PTMOUTPUTFILE}
SUT	SUT	15min	${PTMOUTPUTFILE}
STM	STM	15min	${PTMOUTPUTFILE}
RIO	RIO	15min	${PTMOUTPUTFILE}
franks	franks	15min	${PTMOUTPUTFILE}
whole	whole	15min	${PTMOUTPUTFILE}
END			

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ECO-PTM Input Files
ptm.inp: Particle Flux Output, Particle Insertion (not used for sp studies)

Particle Flux Output: <u>Cumulative percentage</u> of all particles in system passing each location

```
PARTICLE_FLUX_OUTPUT
NAME           FROM_WB          TO_WB           INTERVAL  FILE
SUT_flux       chan:418         chan:379        15min     ${PTMOUTPUTFILE}
STM_flux       chan:419         chan:383        15min     ${PTMOUTPUTFILE}
GS_flux        chan:422         chan:366        15min     ${PTMOUTPUTFILE}
pass_rio       group:RIO_UP     chan:430        15min     ${PTMOUTPUTFILE}
export_swp     res:clifton_court   group:swp    15min     ${PTMOUTPUTFILE}
export_cvp     chan:216         group:cvp       15min     ${PTMOUTPUTFILE}
past_mtz       chan:441         group:mtz       15min     ${PTMOUTPUTFILE}
past_chipps    group:chipps_east   group:chipps_west  15min  ${PTMOUTPUTFILE}
diversion_ag   group:all        group:ag_div    15min     ${PTMOUTPUTFILE}
END


PARTICLE_INSERTION
NODE    NPARTS     DELAY    DURATION
332     1000       10day    1day   # release info stored in ptm_behavior_inputs.inp
END
```

Particle_Insertion specified here for np and pp studies

ECO-PTM Input Files

ptm_behavior_inputs.inp: Input sections for each particle type

Neutrally-Buoyant	Position-Oriented	Salmon
Particle_Type_Inputs	Particle_Type_Inputs	Particle_Type_Inputs
Random_Sequence_Inputs	Random_Sequence_Inputs	Random_Sequence_Inputs
No Swim_Inputs	Swim_Inputs	Swim_Inputs
Route_Inputs	Route_Inputs	Route_Inputs
		Travel_Time_Output
		Fish_Release_Inputs
		Survival_Inputs

Commonly Changed Variables

Variable	Input File Changed
Time period	config.inp
Type of particles	ptm_behaviors_input.inp
# of particles and/or Insertion locations	**np and pp** ptm.inp *Delta or longfin smelt larvae*
	sp ptm_behaviors_input.inp *Chinook salmon smolts*
Flow conditions	config.inp and maybe tidefile*

*The tidefile provided in this training is for **Mar-Aug 2011**
 A longer historical tidefile is available on CNRA Open Data under DSM2

[Direct link to zipfile](#)

DSM2 2022.01 Historical Update Output
DSS output files for 2022.01 Historical Update

Studies/historical_ECO-PTM

- np
- pp
- sp
- tidefile

In np, pp, and sp

- output
- config.inp
- ptm.inp
- ptm_behavior_inputs.inp

In tidefile

- hist_v822.h5

Questions? Please type them into Teams chat

Include slide # if possible

Brad Tom (Bradley.Tom@water.ca.gov)

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3. **Hands-on exercises: Run a simulation for each particle type:**

np Studies — **N**eutrally-Buoyant **P**article studies (delta smelt larvae)

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sp Studies — **S**almon **P**article studies (chinook salmon smolts)

DISCLAIMER

Hands-on Exercise Materials Should ONLY BE USED FOR TRAINING

ECO-PTM model for this class is the same one used for applications

ECO-PTM Hands-on Exercise

Exercise Description

- Flow Conditions:
    - 2011 wet year, high flow

- Insert location:
    - San Joaquin River at Vernalis (Delta and Longfin smelt larvae)
    - Sacramento River at Freeport (Chinook salmon smolts)

- Number of particles:
    - 1,000 (Delta and Longfin smelt larvae)
    - 10,000 (Chinook salmon smolts)

ECO-PTM Studies Setup

study folders

- **delta/dsm2/studies/historical_ECO-PTM/**
  - np
  - pp
  - sp

Open Windows Explorer

2. Enter "explorer" into the search box

3. Click the "File Explorer" icon

1. Click the Windows icon
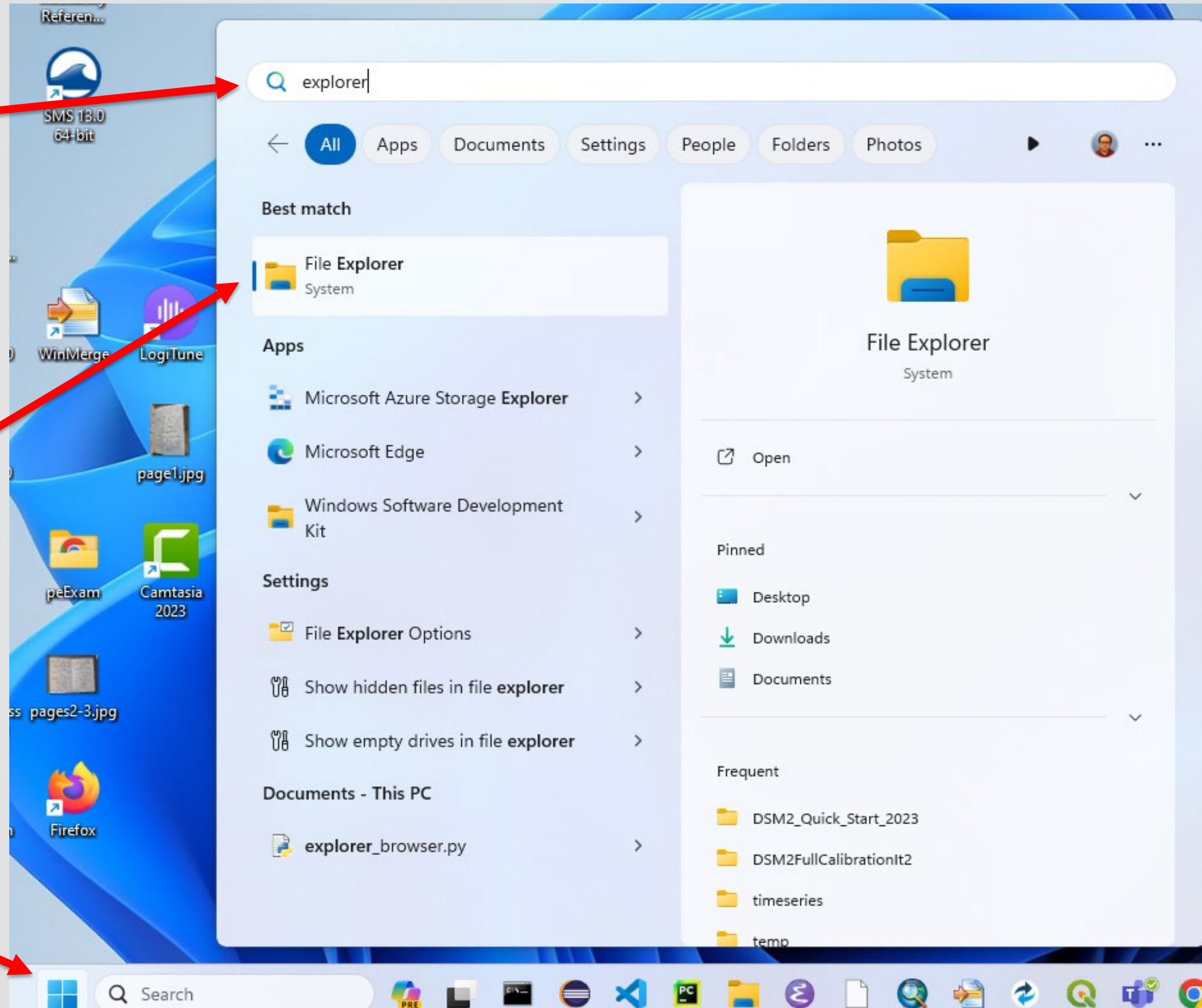
Opening a command prompt window

2. Enter "command" into the search box

3. Click the "Command Prompt" icon

1. Click the Windows icon
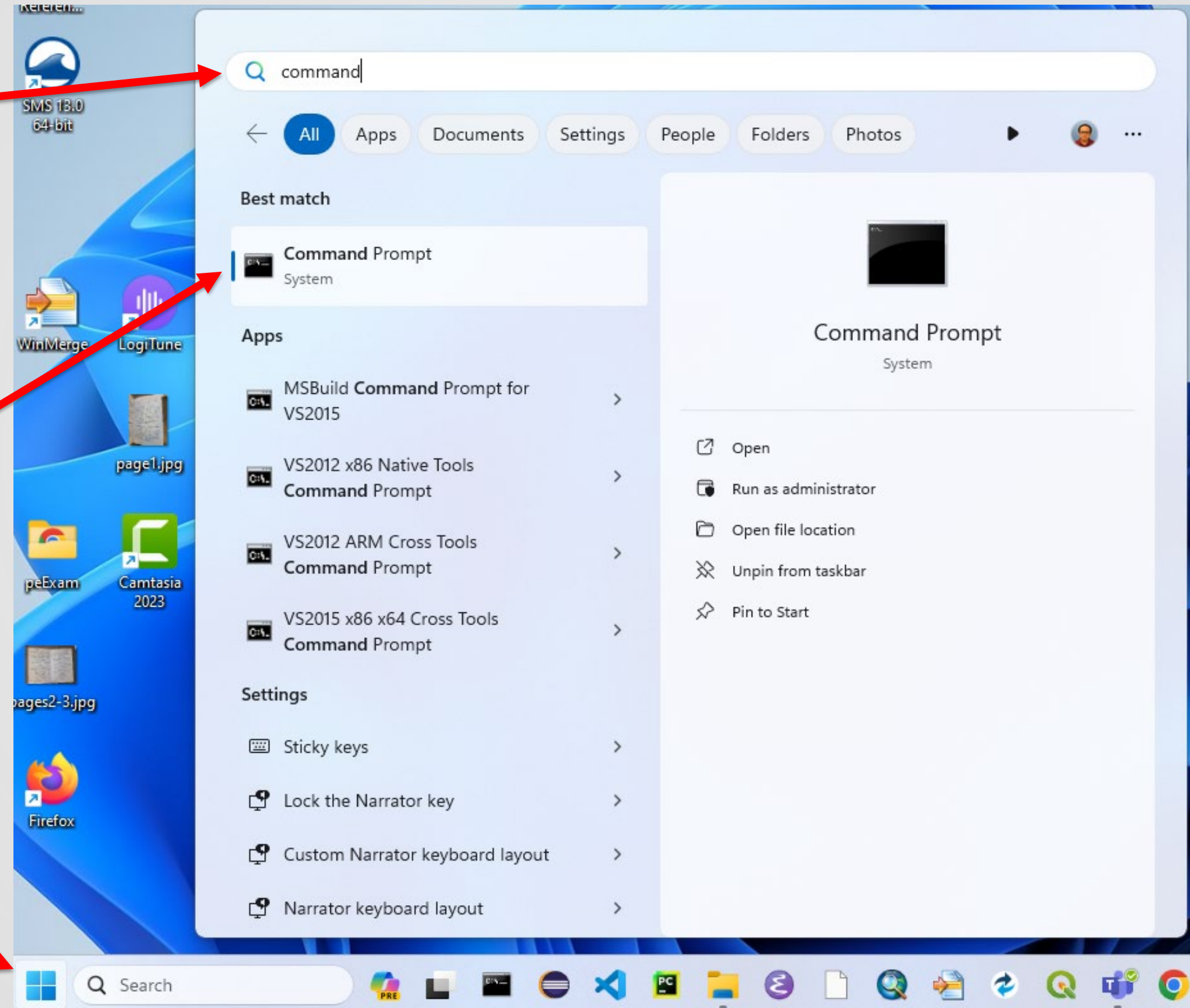
Running The Studies
Open command prompt window, navigate to np folder

np

Delta smelt larvae

Method #1

1. Open a Windows Explorer window
2. Navigate to your np study folder
3. Right click, and select "Open in Terminal"
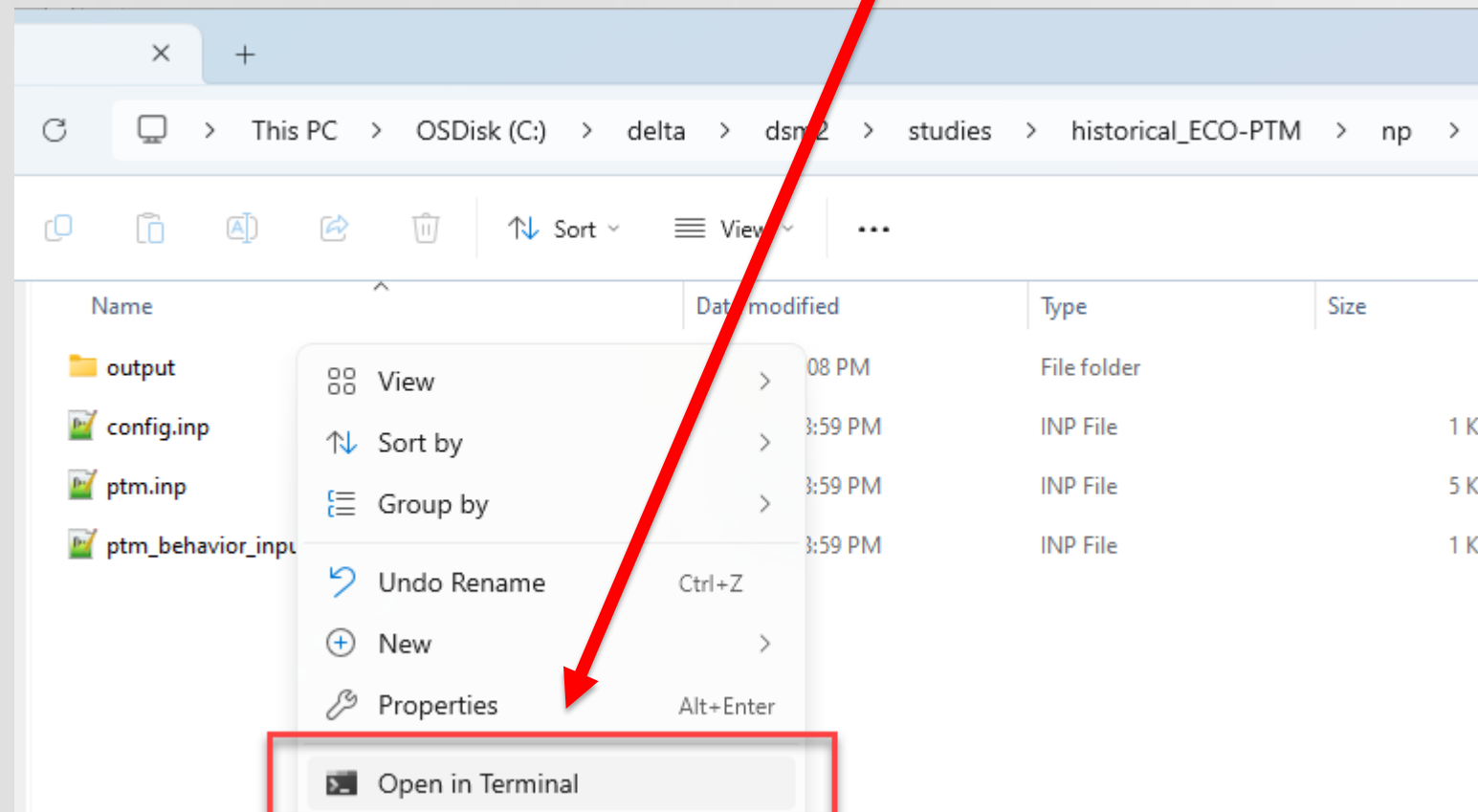
Method #2:

1. Open a command prompt window

2a. If your study is in a different drive change to the drive that contains your study folders, by entering the drive letter followed by a colon.
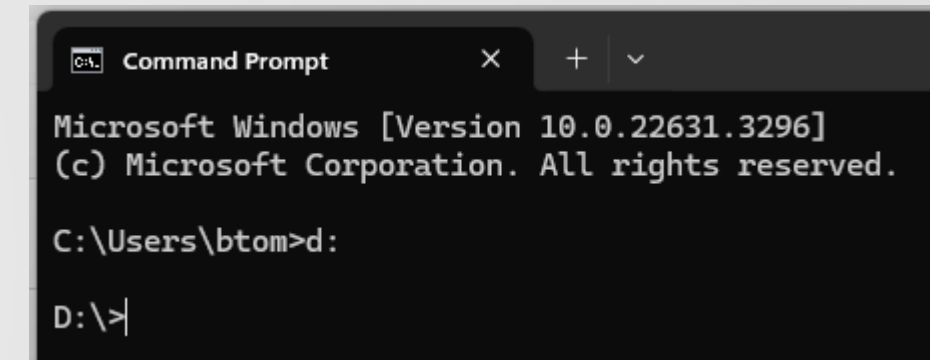
2b. If your study is in the same drive, navigate to the top level of that drive by entering "cd\"
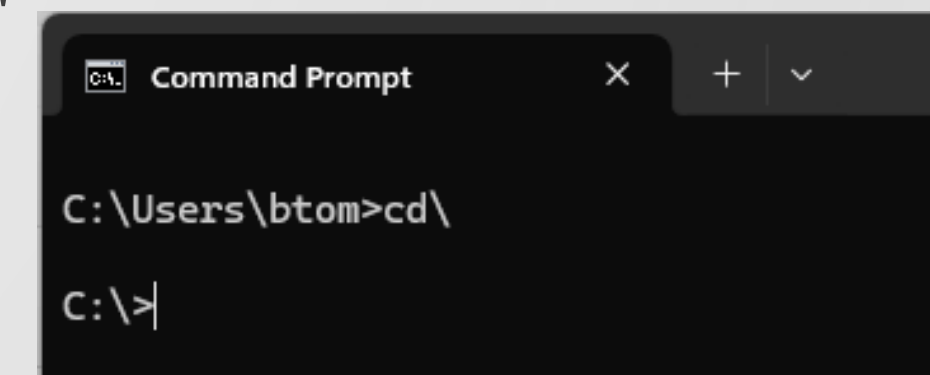
3. Change the directory to the np study folder
cd delta\dsm2\studies\historical_ECO-PTM\np
(press "*enter*")

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Running The Studies
Run ECO-PTM for each of the 3 studies

..\..\..\bin\ptm.bat ptm.inp

   (press "*enter*")

np
Delta smelt
larvae

```
d:\>cd delta\dsm2\studies\historical_ECO-PTM\np

d:\delta\dsm2\studies\historical_ECO-PTM\np>..\..\..\bin\ptm.bat ptm.inp
```

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Running The Studies
Run ECO-PTM for each of the 3 studies

A successful run looks like this:

Model time step being run

Simulation complete

Running The Studies

Run ECO-PTM for the other 2 particle types

Repeat for the pp run

    Step 1: Change directory to the pp study folder

        cd ..\pp (press "*enter*")

    Step 2: Run ECO-PTM

        ..\..\..\bin\ptm.bat ptm.inp (press "*enter*")

pp
Longfin smelt larvae

```
Command Prompt                    ×    +   ⌄

d:\delta\dsm2\studies\historical_ECO-PTM\np>cd ..\pp

d:\delta\dsm2\studies\historical_ECO-PTM\pp>..\..\..\bin\ptm.bat ptm.inp
```

Change from np to pp

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Running The Studies

Run ECO-PTM for the other 2 particle types

Repeat for the sp run

    Step 1: Change directory to the sp study folder

      cd ..\sp (press "*enter*")

    Step 2: Run ECO-PTM

      ..\..\..\bin\ptm.bat ptm.inp (press "*enter*")

sp
Chinook salmon smolts

```
Command Prompt                    ×    +    ∨

d:\delta\dsm2\studies\historical_ECO-PTM\pp>cd ..\sp

d:\delta\dsm2\studies\historical_ECO-PTM\sp>..\..\..\bin\ptm.bat ptm.inp
```

Change from pp to sp

25

Questions? Please type them into Teams chat

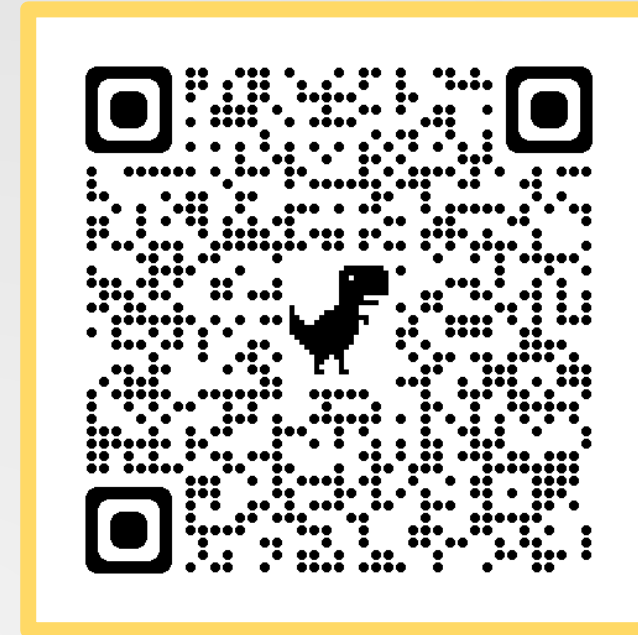### Include slide # if possible

Brad Tom (Bradley.Tom@water.ca.gov)

Go to next slide to start the break timer
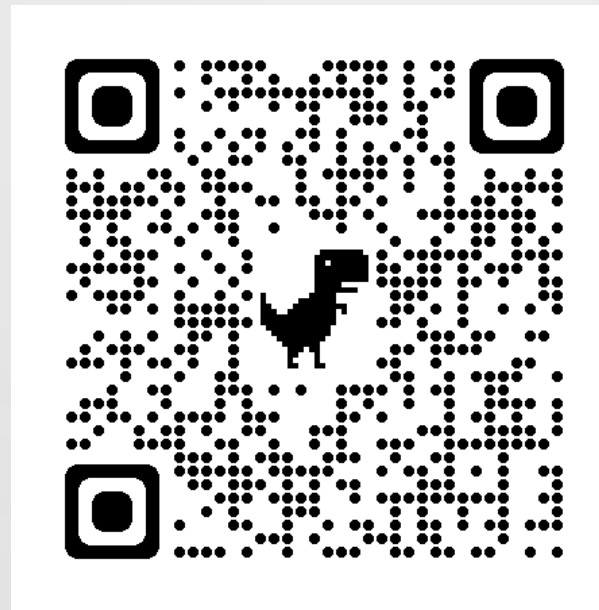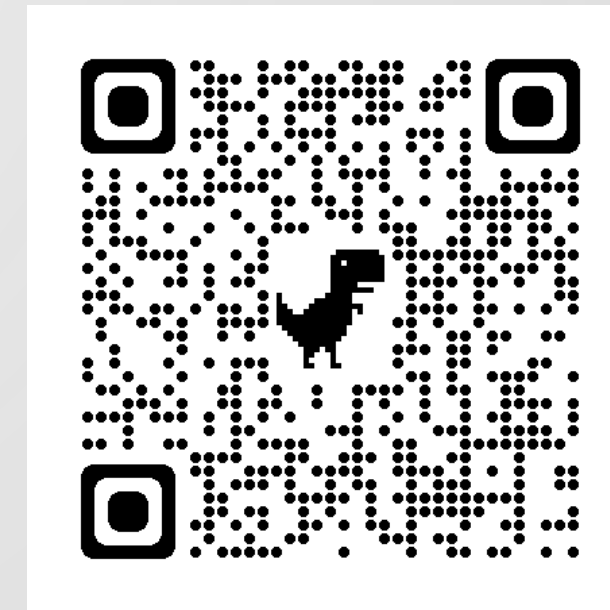
10 minute break

DSM2 Learning Series

Follow-Up Survey

DSM2 Releases

DSM2 code

DSM2 documentation

Extra slides

Setting up ECO-PTM Studies

Create study folders

- Copy the **study_templates/historical_ECO-PTM/** folder to the **studies/** folder
- In the **studies/historical_ECO-PTM/** folder, create 3 copies of each study folder
  - np
  - pp
  - sp

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Setting up an ECO-PTM Study: Copy tidefile (.h5)

- From
  - Delta\DSM2v822\studies\historical\output\
- To
  - Delta\DSM2v822\studies\historical_ECO-PTM\tidefile\

Setting up an ECO-PTM Study:
Configure study folders

- For all 3 studies, open each **config.inp** file and set the start/end dates

10 days after

Time Period	Start Date	End Date
High	15MAR2011	22AUG2011
Medium	**08MAR2012**	**15AUG2012**
Low	21APR2015	28SEP2015

- For the Salmon Particle (sp) study only:
  - Open the **ptm_behavior_inputs.inp** file, and set insertion (Release) dates to 10 days after beginning of simulation

Time Period	Release_Date
High	25MAR2011
Medium	**18MAR2012**
Low	01MAY2015

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