

Running ECO-PTM

ECO-PTM Training, April 16, 2024



Delta Smelt



Longfin Smelt



Chinook Salmon

Brad Tom, DWR Delta Modeling Section

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

Neutrally-Buoyant **P**article studies (delta smelt larvae)

pp Studies

Position-Oriented **P**article studies (longfin smelt larvae)

sp Studies

Salmon **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\:
 - historical_ECO-PTM\:
 - np\
 - pp\
 - sp\

create your studies here

The ECO-PTM historical study folder

neutrally-buoyant particles

position-oriented particles

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	<code>\${DSM2OUTPUTDIR}/trace.out</code> # Trace output file. This file is necessary to calculate the number of particles.
ptm	output	out	none	<code>\${PTMOUTFILE}</code> #Echoed run status
ptm	echo	out	none	<code>\${DSM2OUTPUTDIR}/ptm_echo_\${DSM2MODIFIER}.inp</code> #Echoed input
ptm	behavior	in	none	<code>"ptm_behavior_inputs.inp"</code>
END				

TIDEFILE

START_DATE	END_DATE	FILE
runtime	length	<code>\${HYDROTIDEFILE}</code> # Hydrodynamics file from DSM2 hydro. This file provides grid information as well.
END		

ECO-PTM Input Files

config.inp: same for all particle types

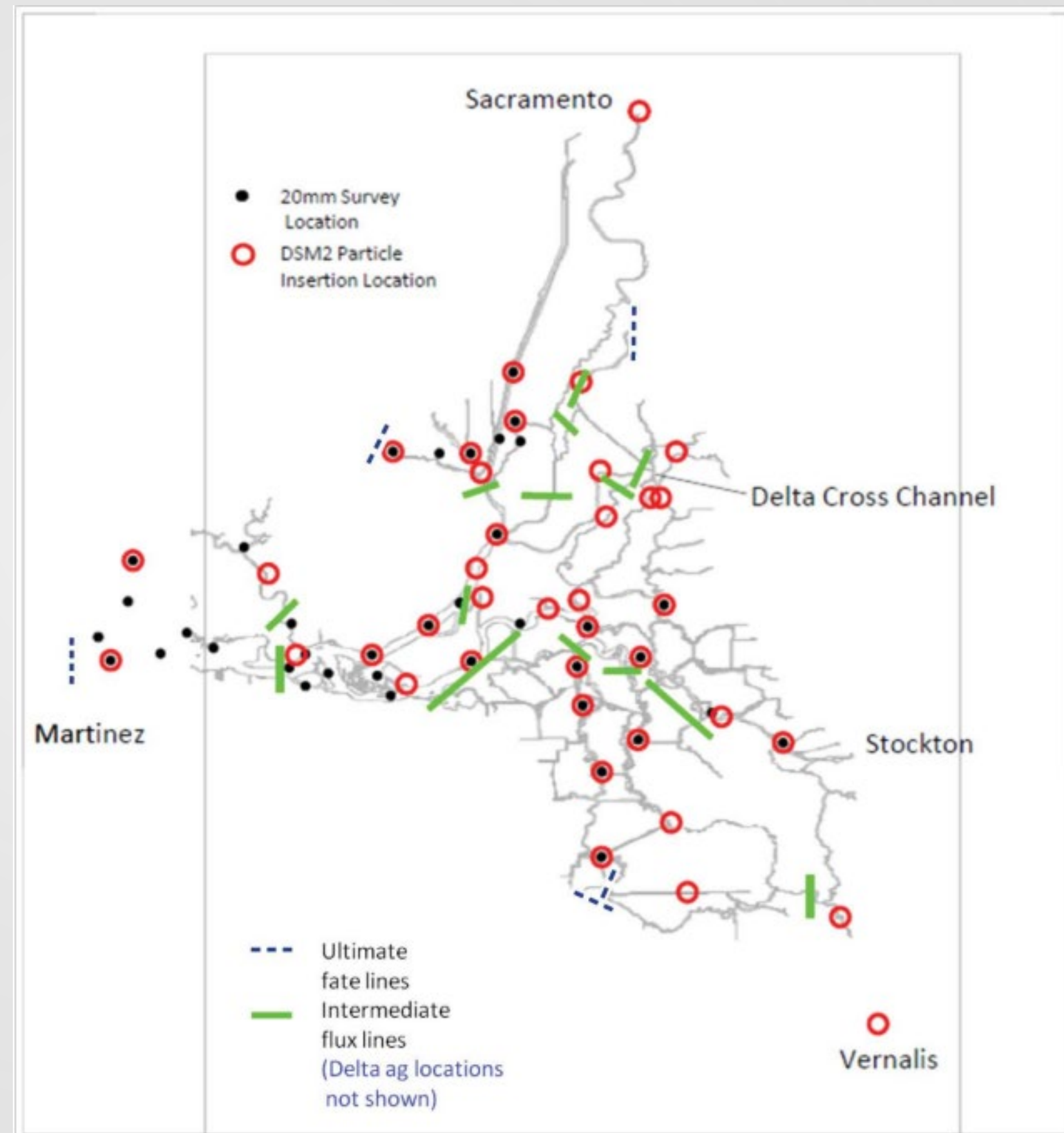
Start and end date
of simulation

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	GROUP_MEMBER			PARTICLE_GROUP_OUTPUT			
NAME	GROUP_NAME	MEMBER_TYPE	PATTERN	NAME	GROUP_NAME	INTERVAL	FILE
SUT	SUT	channel	(379)	GS	GS	15min	\${PTMOUTPUTFILE}
STM	STM	channel	(383)	SUT	SUT	15min	\${PTMOUTPUTFILE}
GS	GS	channel	(366)	STM	STM	15min	\${PTMOUTPUTFILE}
RIO_UP	RIO_UP	channel	(387 398 429)	RIO	RIO	15min	\${PTMOUTPUTFILE}
RIO	RIO	channel	(430)	franks	franks	15min	\${PTMOUTPUTFILE}
chipps_east	chipps_east	channel	(288 294 291)	whole	whole	15min	\${PTMOUTPUTFILE}
chipps_west	chipps_west	channel	(442 437)	END			
ag_div	ag_div	qext	dicu_div_.*				
swp	ag_div	qext	bbid.*				
cvp	swp	qext	swp				
mtz	cvp	qext	cvp				
franks	mtz	stage	mtz.*				
whole	franks	reservoir	franks_tract				
END	whole	channel	.*				
	whole	reservoir	.*				
	END						

ECO-PTM Input Files

ptm.inp: Particle Flux Output, Particle Insertion (not used for sp studies)

Particle Flux Output: Cumulative percentage 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
specified here for
np and pp studies

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

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 <i>Delta or longfin smelt larvae</i>
	sp ptm_behaviors_input.inp <i>Chinook salmon smolts</i>
Flow conditions	config.inp and maybe tidefile*

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

*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

Questions? Please type them into Teams chat
Include slide # if possible



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

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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

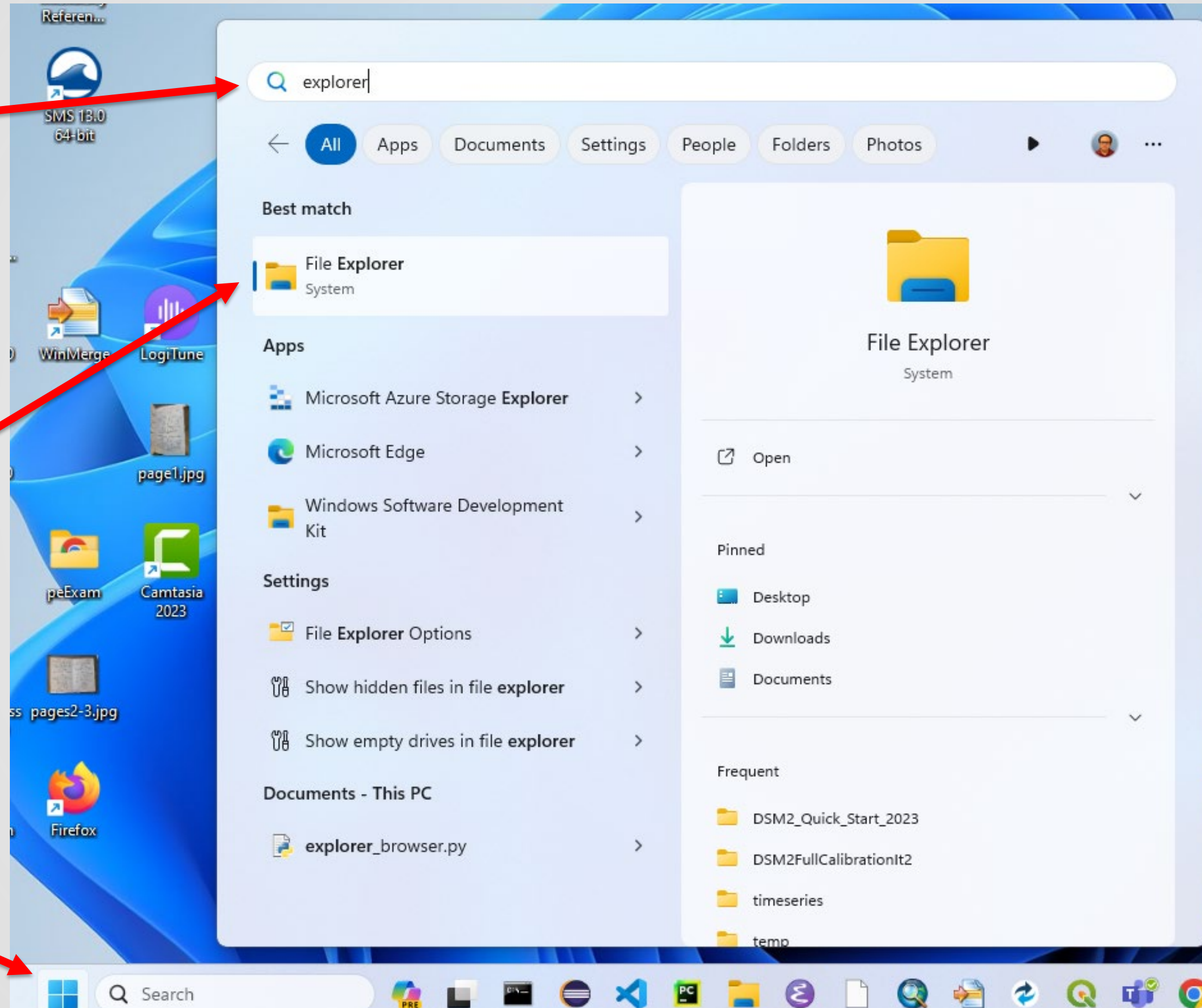
- **delta/dsm2/studies/historical_ECO-PTM/**
 - np
 - pp
 - sp

Open Windows Explorer

2. Enter “explorer” into the search box

3. Click the “File Explorer” icon

1. Click the Windows icon

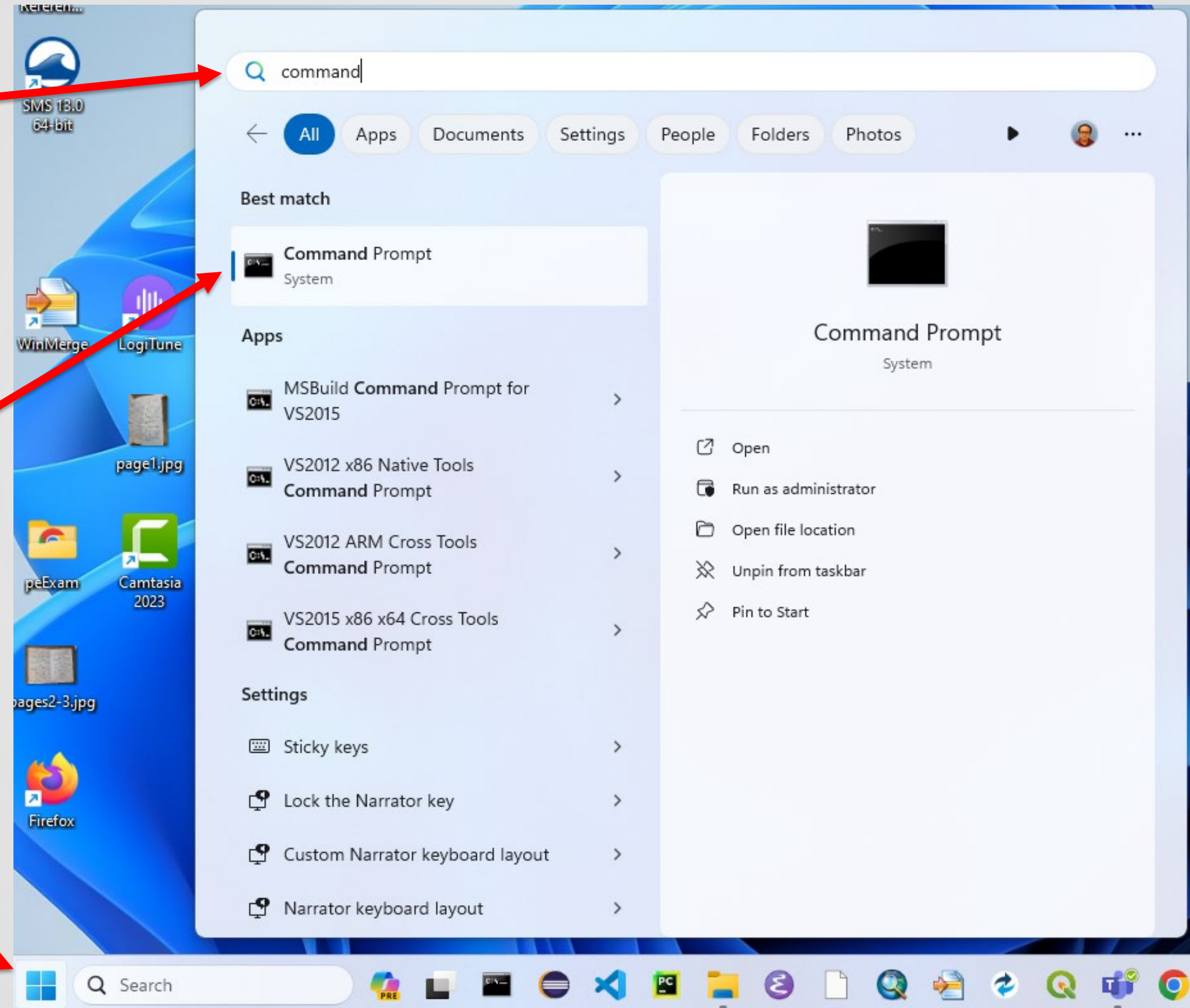


Opening a command prompt window

2. Enter “command” into the search box

3. Click the “Command Prompt” icon

1. Click the Windows icon





Raise hand in Teams when done

np

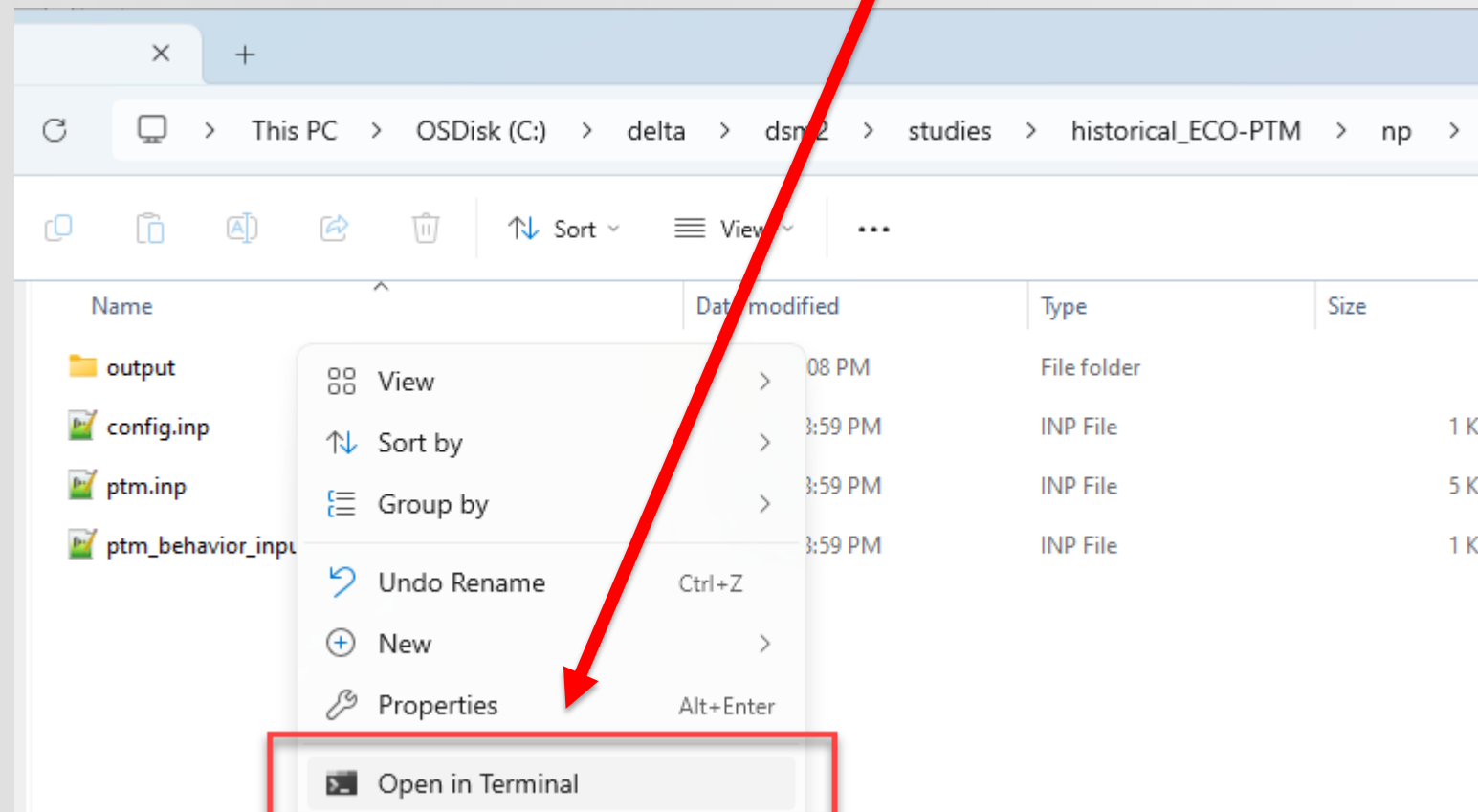
Delta smelt larvae

Running The Studies

Open command prompt window, navigate to np folder

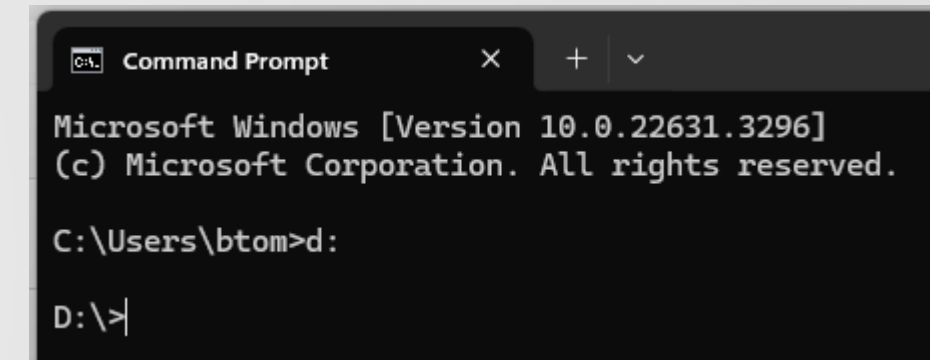
Method #1

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

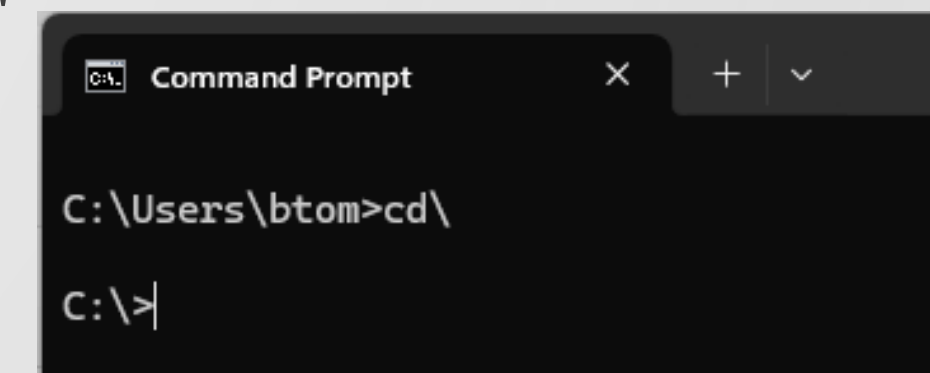


Method #2:

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")

Running The Studies

Run ECO-PTM for each of the 3 studies



Raise hand in Teams when done

..\..\..\bin\ptm.bat ptm.inp
(press “*enter*”)

np
Delta smelt
larvae

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

Running The Studies

Run ECO-PTM for each of the 3 studies

A successful run looks like this:

```
Command Prompt
Model date: 03AUG2011 time: 2400
Model date: 04AUG2011 time: 2400
Model date: 05AUG2011 time: 2400
Model date: 06AUG2011 time: 2400
Model date: 07AUG2011 time: 2400
Model date: 08AUG2011 time: 2400
Model date: 09AUG2011 time: 2400
Model date: 10AUG2011 time: 2400
Model date: 11AUG2011 time: 2400
Model date: 12AUG2011 time: 2400
Model date: 13AUG2011 time: 2400
Model date: 14AUG2011 time: 2400
Model date: 15AUG2011 time: 2400
Model date: 16AUG2011 time: 2400
Model date: 17AUG2011 time: 2400
Model date: 18AUG2011 time: 2400
Model date: 19AUG2011 time: 2400
Model date: 20AUG2011 time: 2400
Model date: 21AUG2011 time: 2400
-----DSS---ZOPEN: Existing File Opened, File: ./output/ptmout.dss
Unit: 71; DSS Versions - Software: 6-WE, File: 6-WE
-----DSS---ZCLOSE Unit: 71, File: ./output/ptmout.dss
Pointer Utilization: 0.25
Number of Records: 90
File Size: 1191.8 Kbytes
Percent Inactive: 0.0
done simulation
D:\delta\DSM2v822\studies\historical_ECO-PTM\np_high>
```

Model time step being run

Simulation complete



Raise hand in Teams when done

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
```



Raise hand in Teams when done

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
```


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Go to next slide to start the break timer