

Project _____
 Observer _____ Surveyor _____ Firm _____
 County _____ Section _____ Township _____ Range _____

Bureau of Surveying & Mapping

Mean High Water Data Collection Package

RANGE RATIO METHOD – COVER SHEET

If tide staff(s) are set on NGVD 1929 or local tidal datum; place a check mark in the appropriate box(es) below and proceed to page 2

Control Tide Station Subordinate Tide Station

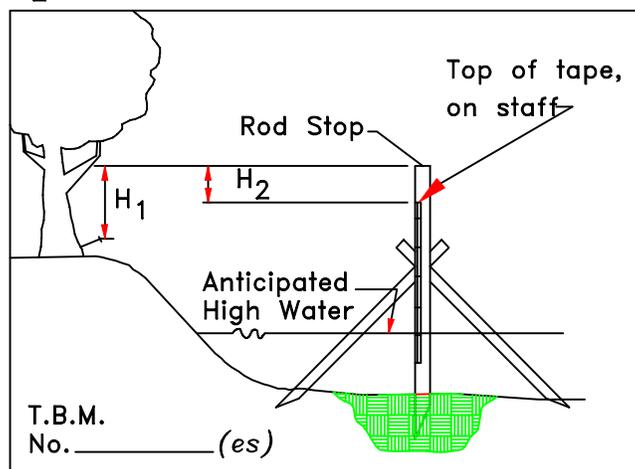
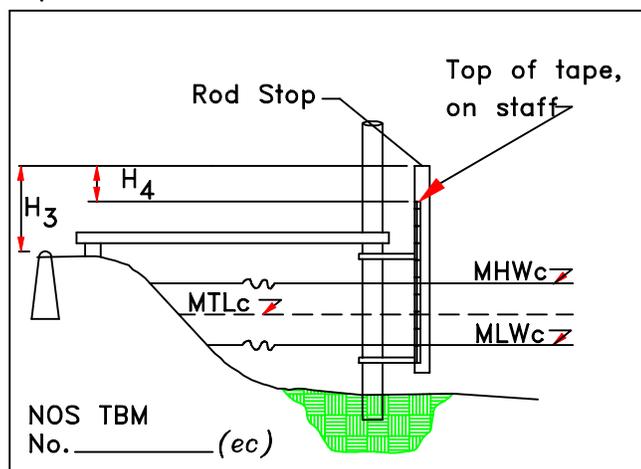
(this form to be filled out by observer – copy to be submitted to FDEP;
 use this form for determination of Staff Conversion Factor)

Control Tide Station Data:

Subordinate Tide Station Data:

(ac) No. 872 _ _ _ _ , _____
 (bc) Top of tape, on staff _____
 (cc) $H_3 =$ _____
 (dc) $H_4 =$ _____

(as) No. _____
 (bs) Top of tape, on staff _____
 (cs) $H_1 =$ _____
 (ds) $H_2 =$ _____



If NGVD is available at project site:

| Description | Elevation (ft. NGVD) | on staff (feet) | source | Description | Elevation (ft. NGVD) | on staff (feet) | source |
|----------------------|--|-----------------|----------------|----------------------|---------------------------|-----------------|----------------|
| NOS-TBM(ec) | (fc) _____ ¹ +(gc) _____ | _____ | 1 | BM (es) | (fs) _____ +(gs) _____ | _____ | H ₁ |
| Rod Stop | (hc) _____ -(ic) _____ | _____ | H ₄ | Rod Stop | (hs) _____ -(is) _____ | _____ | H ₂ |
| Top of Tape on Staff | (jc) _____ | (bc) _____ | | Top of Tape on Staff | (js) _____ | (bs) _____ | |

To convert the published tidal datum to an "on staff" reading subtract (jc) from (bc). This is the staff conversion factor. (kc) _____

To convert the computed MHWs on staff reading to NGVD subtract (js) from (bs). This is the staff conversion factor. (ks) _____

To determine "on staff" values of published tidal datums:
 $MHWc = ((kc) \text{ _____} + (lc) \text{ _____}^1) = (mc) \text{ _____}$ feet, on staff

To determine NGVD values of computed tidal datums:
 $MHWs = ((ms) \text{ _____}^2 - (ks) \text{ _____})$

$MTLc = ((kc) \text{ _____} + (nc) \text{ _____}^1) = (oc) \text{ _____}^3$ feet, on staff

$MHWs = (ls) \text{ _____}$ feet, NGVD

$MLWc = ((kc) \text{ _____} + (pc) \text{ _____}^1) = (qc) \text{ _____}$ feet, on staff

Notes:

Note: $M Rc = (mc) \text{ _____} - (qc) \text{ _____} = (rc) \text{ _____}$ (Does this value agree with MRc)?

- 1 NOS Published Sheets
- 2 from (r) Page 2, Summary Sheet
- 3 use in Range Ratio formulae

FIGURE 20

Project _____
 Observer _____ Surveyor _____ Firm _____
 County _____ Section _____ Township _____ Range _____



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RANGE RATIO METHOD – SUMMARY SHEET

(this form to be filled out by observer – copy
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OBSERVATION SESSIONS 1,2,and 3

(a) Control Tide Station 872 _ _ _ _ and (b) Subordinate Tide Station _____

Given: on staff values, (see page 1)

(c) MHWc mean high water _____

(d) MRc mean range of tide _____

(e) MTLc mean tide level _____

OBSERVATION SESSION 1 DATE ___/___/___

(see page 3)

Formulae:

(f1) HWc _____ (j1) HWs _____

(1) $MRs = Rs (MRc/Rc)$ _____ (n1)

(g1) LWc _____ (k1) LWs _____

(2) $MTLs = MTLc + (TLs - TLc)$ _____ (o1)

(h1) Rc _____ (l1) Rs _____

(3) $MHWs = MTLs + (MRs/2)$

(i1) TLc _____ (m1) TLs _____

Box 1 MHWs _____ (p1)

= _____ (p1) on staff (insert in box 1)

OBSERVATION SESSION 2 DATE ___/___/___

(see page 4)

Formulae:

(f2) HWc _____ (j2) HWs _____

(1) $MRs = Rs (MRc/Rc)$ _____ (n2)

(g2) LWc _____ (k2) LWs _____

(2) $MTLs = MTLc + (TLs - TLc)$ _____ (o2)

(h2) Rc _____ (l2) Rs _____

(3) $MHWs = MTLs + (MRs/2)$

(i2) TLc _____ (m2) TLs _____

Box 2 MHWs _____ (p2)

= _____ (p2) on staff (insert in box 2)

OBSERVATION SESSION 3 DATE ___/___/___

(see page 5)

Formulae:

(f3) HWc _____ (j3) HWs _____

(1) $MRs = Rs (MRc/Rc)$ _____ (n3)

(g3) LWc _____ (k3) LWs _____

(2) $MTLs = MTLc + (TLs - TLc)$ _____ (o3)

(h3) Rc _____ (l3) Rs _____

(3) $MHWs = MTLs + (MRs/2)$

(i3) TLc _____ (m3) TLs _____

Box 3 MHWs _____ (p3)

= _____ (p3) on staff (insert in box 3)

TIDE STUDY EVALUATION

Sum of boxes 1,2 and 3 _____ /3 = _____ q

| Box No | MHWs feet | Average MHWs | Deviation* feet | SURVEYORS COMMENTS |
|--------|-------------------------|--------------|-----------------|--------------------|
| 1 | _____ (P ₁) | _____ (q) | _____ | _____ |
| 2 | _____ (P ₂) | _____ (q) | _____ | _____ |
| 3 | _____ (P ₃) | _____ (q) | _____ | _____ |

* disregard sign

_____ /3 = _____ (r) mean deviation

Adjusted MHWs:
 _____ (r) feet
 on staff
 insert at line
 (ms) on page
 1 of 5

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RANGE RATIO METHOD

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OBSERVATION SESSION 1

(a) At: Control Tide Station 872 _ _ _ _ and (b) Subordinate Tide Station _____

| | | |
|--|----------------------|--------------------|
| Weather conditions during high water observations: | <u>Begin Session</u> | <u>End Session</u> |
| Wind Speed/Direction (out of) | ___ mph/___ | ___ mph/___ |
| Temperature | ___ °F | ___ °F |
| Barometric Pressure | ___ in/Hg | ___ in/Hg |

STAFF OBSERVATION NOTES:

At Control Tide Station 872 _____,

(for your convenience - record time and staff observation)

CLOCK TIME 24 - hour format

Date ___/___/___ Date ___/___/___

| INDICATE CLOCK TIME (minutes) | HIGH WATER | | | LOW WATER | | |
|-------------------------------|------------|--------|--------|-----------|--------|--------|
| | ___:00 | ___:00 | ___:00 | ___:00 | ___:00 | ___:00 |
| :00 | _____ | _____ | _____ | _____ | _____ | _____ |
| : | _____ | _____ | _____ | _____ | _____ | _____ |
| : | _____ | _____ | _____ | _____ | _____ | _____ |
| : | _____ | _____ | _____ | _____ | _____ | _____ |

CONTROL SUMMARY (ON STAFF)

HWc (Highest Water observed) = _____ LWc (Lowest Water observed) = _____
 Rc = (HWc - LWc) = _____ TLc = (HWc + LWc)/2 = _____

At Subordinate Tide Station _____

(for your convenience - record time and staff observation)

Date ___/___/___ Date ___/___/___

| INDICATE CLOCK TIME (minutes) | HIGH WATER | | | LOW WATER | | |
|-------------------------------|------------|--------|--------|-----------|--------|--------|
| | ___:00 | ___:00 | ___:00 | ___:00 | ___:00 | ___:00 |
| :00 | _____ | _____ | _____ | _____ | _____ | _____ |
| : | _____ | _____ | _____ | _____ | _____ | _____ |
| : | _____ | _____ | _____ | _____ | _____ | _____ |
| : | _____ | _____ | _____ | _____ | _____ | _____ |

SUBORDINATE SUMMARY (ON STAFF)

HWs (Highest Water observed) = _____ LWs (Lowest Water observed) = _____
 Rs = (HWs - LWs) = _____ TLs = (HWs + LWs)/2 = _____

Project _____
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RANGE RATIO METHOD

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OBSERVATION SESSION 2

(a) At: Control Tide Station 872 _ _ _ _ and (b) Subordinate Tide Station _____

| | | |
|--|----------------------|--------------------|
| Weather conditions during high water observations: | <u>Begin Session</u> | <u>End Session</u> |
| Wind Speed/Direction (out of) | ___mph/___ | ___mph/___ |
| Temperature | ___°F | ___°F |
| Barometric Pressure | ___in/Hg | ___in/Hg |

STAFF OBSERVATION NOTES:

At Control Tide Station 872 _____,
 (for your convenience - record time and staff observation)
 CLOCK TIME 24 - hour format

| | | | | | | | | | | | | | | | |
|----------------------------------|-------------|------------|-----|-----|-----|-----|-----|-----------|-----|-----|-----|-----|-----|------|-------------|
| Date | ___/___/___ | HIGH WATER | | | | | | LOW WATER | | | | | | Date | ___/___/___ |
| | | [] | [] | [] | [] | [] | [] | [] | [] | [] | [] | [] | [] | | |
| INDICATE CLOCK TIME (minutes) | | :00 | :00 | :00 | :00 | :00 | :00 | :00 | :00 | :00 | :00 | :00 | :00 | | |
| | | : | : | : | : | : | : | : | : | : | : | : | : | | |
| | | : | : | : | : | : | : | : | : | : | : | : | : | | |
| | | : | : | : | : | : | : | : | : | : | : | : | : | | |

CONTROL SUMMARY (ON STAFF)

HWc (Highest Water observed) = _____ LWc (Lowest Water observed) = _____
 Rc = (HWc - LWc) = _____ TLc = (HWc + LWc)/2 = _____

At Subordinate Tide Station _____
 (for your convenience - record time and staff observation)

| | | | | | | | | | | | | | | | |
|----------------------------------|-------------|------------|-----|-----|-----|-----|-----|-----------|-----|-----|-----|-----|-----|------|-------------|
| Date | ___/___/___ | HIGH WATER | | | | | | LOW WATER | | | | | | Date | ___/___/___ |
| | | [] | [] | [] | [] | [] | [] | [] | [] | [] | [] | [] | [] | | |
| INDICATE CLOCK TIME (minutes) | | :00 | :00 | :00 | :00 | :00 | :00 | :00 | :00 | :00 | :00 | :00 | :00 | | |
| | | : | : | : | : | : | : | : | : | : | : | : | : | | |
| | | : | : | : | : | : | : | : | : | : | : | : | : | | |
| | | : | : | : | : | : | : | : | : | : | : | : | : | | |

SUBORDINATE SUMMARY (ON STAFF)

HWs (Highest Water observed) = _____ LWs (Lowest Water observed) = _____
 Rs = (HWs - LWs) = _____ TLs = (HWs + LWs)/2 = _____

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OBSERVATION SESSION 3

(a) At: Control Tide Station 872 _ _ _ _ and (b) Subordinate Tide Station _____

Weather conditions during high water observations: Begin Session End Session
 Wind Speed/Direction (out of) _____ mph/____ _____ mph/____
 Temperature _____ °F _____ °F
 Barometric Pressure _____ in/Hg _____ in/Hg

STAFF OBSERVATION NOTES:

At Control Tide Station 872 _____,
 (for your convenience - record time and staff observation)
 CLOCK TIME 24 - hour format

Date ___/___/___ Date ___/___/___

| INDICATE CLOCK TIME (minutes) | HIGH WATER | | | LOW WATER | | |
|-------------------------------|------------|-------|-------|-----------|-------|-------|
| | ___00 | ___00 | ___00 | ___00 | ___00 | ___00 |
| :00 | _____ | _____ | _____ | _____ | _____ | _____ |
| : | _____ | _____ | _____ | _____ | _____ | _____ |
| : | _____ | _____ | _____ | _____ | _____ | _____ |
| : | _____ | _____ | _____ | _____ | _____ | _____ |

CONTROL SUMMARY (ON STAFF)

HWc (Highest Water observed) = _____ LWc (Lowest Water observed) = _____
 $R_c = (HWc - LWc) = \text{_____}$ $TL_c = (HWc + LWc)/2 = \text{_____}$

At Subordinate Tide Station _____
 (for your convenience - record time and staff observation)

Date ___/___/___ Date ___/___/___

| INDICATE CLOCK TIME (minutes) | HIGH WATER | | | LOW WATER | | |
|-------------------------------|------------|-------|-------|-----------|-------|-------|
| | ___00 | ___00 | ___00 | ___00 | ___00 | ___00 |
| :00 | _____ | _____ | _____ | _____ | _____ | _____ |
| : | _____ | _____ | _____ | _____ | _____ | _____ |
| : | _____ | _____ | _____ | _____ | _____ | _____ |
| : | _____ | _____ | _____ | _____ | _____ | _____ |

SUBORDINATE SUMMARY (ON STAFF)

HWs (Highest Water observed) = _____ LWs (Lowest Water observed) = _____
 $R_s = (HWs - LWs) = \text{_____}$ $TL_s = (HWs + LWs)/2 = \text{_____}$