

Name: _____

Date: _____

HYDRO SIMULATION Questions
for the
WES-2 Bridge Hydro Simulation Capability
WARNING DECISION TRAINING DIVISION (WDTD)

**Print this form and record your answers as you go through
the simulation on the WES-2 Bridge or on this sheet.**

Then use this sheet to input your answers into the CLC and receive a passing score for completion.

Quiz #1: June 27, 2014

1). Focus solely on river flooding-related hazards. No severe convective, flash flooding, or other possible weather hazards. Remember, today is Friday, June 27th. Based on your data analysis from today, select the most representative choice to input in the upcoming issuance of the Hazardous Weather Outlook (HWO), for the "Days 2-7" section.

- A). NO HAZARDOUS WEATHER IS EXPECTED AT THIS TIME.
- B). MINOR RIVER FLOODING WILL OCCUR ALONG PORTIONS OF THE DES MOINES...CEDAR...SOUTH SKUNK...AND IOWA RIVERS NEXT MONDAY THROUGH WEDNESDAY.
- C). PERIODIC HEAVY RAIN OVER THE NEXT FEW DAYS MAY CAUSE FLOODING OF AREA RIVERS EARLY NEXT WEEK.
- D). SIGNIFICANT RIVER FLOODING IS EXPECTED AREAWIDE NEXT WEEK.

2). First, look at the AMEI4 hydrograph. That site has been falling very slowly the last few days with a slight increase over the last few hours from rainfall in the area. It has a fairly small drainage basin, and no routine forecast points. What would be your course of action?

- A). Issue a River Flood Warning for minor flooding
- B). Request non-routine RFC guidance
- C). No Special Action
- D). Issue a Flood Watch

3). Look at MIWI4. Part of its drainage basin saw some rainfall yesterday and the forecast calls for a small bump to slow a steadily falling trend. The river is currently above action stage but below flood stage. What action would you take at that site?

- A). No immediate action
- B). Issue a River Flood Watch
- C). Issue a River Flood Statement for Action Stage
- D). Issue a River Flood Warning
- E). Investigate how much QPF went into the river guidance in a collaboration call with the RFC

4). Looking at CEDI4, the drainage basin for this river has been mostly dry until yesterday, and the river is falling fast. Forecast guidance takes the river below flood stage by late tonight and continues a decrease over the next few days. Is this forecast accurate based on the current QPF forecast?

- A). Yes
- B). No

5). If the forecast drop for CEDI4 is not representative of the forecast QPF, what action would you take?

- A). Call or chat the RFC on 12Planet and discuss the input QPF.
- B). Issue a River Flood Warning, assuming the river will rise again.
- C). No action for this site. Wait for the next RFC update.

6). Open the Impact Statements window for CEDI4 from the "ReferenceData" menu. At 88.5 feet, close to the current water levels, what impacts occur?

- A). Water covers the George Wyth Museum parking lot.
- B). Water enters the 15th street soccer fields.
- C). Water covers the bike path at George Wyth Park.
- D). There is no impact statement for this level.

7). Look at DESI4. You notice the forecast "bump" in the levels tonight which appears to be from the forecast precipitation. You decide to call the RFC and check. The on-duty HAS forecaster says that 12 hours of QPF factored into the current forecasts. What action would you take at this site?

- A). Consider including more QPF in another run, and continue the River Flood Warning.
- B). Remove the QPF and forecast a drop in the river.
- C). Cancel the River Flood Warning.
- D). Upgrade/update the River Flood Warning to account for "Major" flooding.

8). Open the Impact Statements window for DESI4. Reports of 3 to 4 inches of rain yesterday drove the river about 2 feet higher. What would the impact be if the river rose another two feet after rainfall today?

- A). little change in the impacts.
- B). increase the flood to Moderate, but no real impacts change.
- C). increase the flood to Moderate, with adjacent city streets flooded.

9). The Polk Co. (Iowa) Emergency Manager calls and asks for a briefing on that status of DESI4 and asks "what do you think" will happen there. What would you want to communicate? Choose the best answers.

- A). Explain that there is no risk of flooding at this site at this time.
- B). Explain the RFC's latest forecast levels and notify them that "that's it, we can't change it".
- C). Any additional rainfall would cause the river to rise, but otherwise it will drop slowly in the meantime.
- D). A rise of 1 to 3 feet would be possible if the forecast rain amounts occur (and specify the amount).
- E). Not much change but your office will be closely monitoring and the forecast will be updated, check back with any questions.

10). Now, on to DMOI4. The site rose slightly yesterday and is forecast to meander around the action level threshold for the next few days. Looking at the impact statements, residential and structural impacts begin when river levels close to the current level. Remember, this site lies below (downstream of) Saylorville Lake Dam. Assume this forecast is reasonable considering planned discharge. What action would you take for this site?

- A). Issue a River Flood Warning.
- B). Issue a River Flood Watch.
- C). Continue an action stage forecast, brief stakeholders on possible contingencies.
- D). Forecast a fall in the river.

11). Finally, look at DEMI4. This point rose above action stage but appears to have crested just below flood stage. The forecast calls for another slow rise that will climb very close to flood stage before falling through days 3 and beyond. What is your action for this site?

- A). Brief stakeholders for significant impacts.
- B). Consider a River Flood Warning if your confidence is high enough.
- C). Issue a River Flood Watch.
- D). Continue to forecast a fall in the river.

Quiz #2: June 28, 2014

1). You are asked to give a briefing on a state-wide Iowa Homeland Security & Emergency Management call this morning. Considering the events and your analysis from June 27th, select all of the following elements that would be preferable to include in your briefing?

- A). Your dinner plans tonight.
- B). The most likely scenario and the uncertainty associated with it.
- C). Notify all that your office only follows the river trends, not generate river forecasts.
- D). Potential Impacts, including your best estimate for where/when (based on the current forecast).
- E). How frustrating and difficult river forecasting can be.
- F). The high temperature forecast for the next few days (after all, the 4th of July is coming up).

2). Look at AMEI4. Overnight, the stage rose about 4 feet, but the discharge increased 5-fold, a very respectable increase. Be aware that there can be variability from one site to the other, depending on the width, depth, and inflowing tributaries, even on the same river. The river appears to be going back down for the time being. Check the impact statements for this site. Note that some impacts start at levels just slightly higher than the current values. What are your actions for this site?

- A). Issue a River Flood Warning.
- B). Initiate forecast guidance for this site, ask for 5 days of QPF for “worst case” planning.
- C). No action necessary at this time.
- D). Initiate forecast guidance for this site. Make sure QPF reflects current thinking.

3). At MIWI4, the Iowa River has been rising steadily in response to the last 24 hours rainfall, and is up about 0.7 ft from our last check. The initial run of guidance shows the river cresting tonight and slowly falling through July 2nd. What action would you take at this site?

- A). Contact the RFC. Consider a new guidance run with higher QPFs.
- B). Issue a River Flood Warning.
- C). Issue a River Flood Watch.
- D). No action necessary at this time.

4). If the new guidance at CEDI4 took it above flood stage in about 24-36 hours, but your confidence level is only about 60% confident, what product could you issue?

- A). River Flood Warning.
- B). Flash Flood Warning.
- C). Flash Flood Watch.
- D). River Flood Watch.

5). At CEDI4, the river is still falling but yesterday's sharp drop is curtailed in RFC guidance. The guidance now brings the river back above flood stage by tomorrow morning and keeps it above that level through July 2nd. This forecast follows a trend started during the evening yesterday that began raising the river level opposite of the earlier projections of a steady drop. Let's say you are high confidence with this forecast. What are your actions for this site?

- A). No action necessary.
- B). Issue a River Flood Statement for Action Stage.
- C). Issue a River Flood Warning.
- D). Issue a River Flood Watch.

6). At DESI4, levels have basically held steady over the last 24 hours with a general forecast to do the same through the next 18 hours or so before falling sharply through the end of the period. Again, check the Impact Statements for this site. The RFC is confident about this set of guidance for this particular point as it is based on 24 hour QPF. What is your action for this site?

- A). Drop the River Flood Warning, based on the river going into Action Stage.
- B). Undercut the guidance and take no further action.
- C). Continue the River Flood Warning.
- D). Issue a River Flood Watch.

7). At DMOI4, levels continue to hold steady near the action stage. The RFC guidance includes QPF out to 24 hours in the future. No major discharge changes are anticipated. What are your actions for this site?

- A). Keep the forecast close to guidance and the current trend.
- B). Issue a River Flood Warning.
- C). Issue a River Flood Watch.

8). DEMI4. This point is very close to flood stage and falling shortly after cresting last evening. Guidance suggests an increase from the additional rainfall that is on the way that will put the site back above flood stage. What is your action for this site?

- A). Drop the River Flood Warning.
- B). Continue the River Flood Warning.

Quiz #3: June 29, 2014

1). At AMEI4, levels are back on a steady rise following yesterday's rains, although the bullseye of higher rains were to the east of the drainage basin. The previous shift continued the request for RFC guidance and although you can't see it here, it shows this location approaching but not quite reaching flood stage by tomorrow evening based on 24 hour QPF. What are your actions?

- A). Continue the non-routine forecast guidance.
- B). Discontinue the non-routine forecast guidance.

2). At MIWI4, the river continues to rise steadily. The evening shift forecaster continued a River Flood Watch for the site but cited that guidance remained below the stage as the reasoning for not replacing the watch with a warning overnight. Your latest guidance levels-off the river at about 0.3 ft below flood stage tonight. Check the Impact Statements for the site. It is clear that some impacts are already occurring near this site based on current stage levels. The drainage basin is under the relative QPF bullseye over the next 72 hours. What implications will that have on your forecast? Choose all that apply.

- A). QPF amounts will not matter.
- B). This suggests the potential for heavy rainfall is higher.
- C). This creates a higher "forecast-bust" potential, if rainfall doesn't materialize.
- D). This makes the forecast more accurate.
- E). All of this points to you needing to upgrade the watch to a River Flood Warning.
- F). This will better capture river response, if the QPF forecast is reasonably accurate.

3). Also, for MIWI4, notice in Impact Statements that the impacts are already underway at the current water levels. What are your actions for this site, assuming the forecast you have is using 24 hour QPF?

- A). Issue a River Flood Watch.
- B). Issue a River Flood Warning.
- C). No action is necessary at this time.
- D). Issue a River Flood Statement for action stage.

4). CEDI4. The downward trend seems to have reversed and the river rose above flood stage once again yesterday evening after a convective complex moved through the area. RFC guidance shows the rise slowing down, but it is already behind the latest stage. What action would you take?

- A). Contact the RFC and collaborate on new forecast guidance.
- B). Go above the current flood guidance in your product decision-making.
- C). Go below the current flood guidance in your product decision-making.
- D). No action is necessary at this time.

5). DESI4. This river appears to be falling, and its drainage basin missed some of the heavier rains yesterday. The river has fallen below flood stage. Note the 1446Z guidance which factored less QPF than the 1510Z forecast which was run as part of your earlier collaboration effort. This forecast seems to match the falling curve better and shows another bounce back close to flood stage by tomorrow evening.

What are your actions for this site?

- A). Request another round of guidance.
- B). Consult the Station Duty Manual.
- C). Go with the previous forecast.
- D). Continue the River Flood Warning.

6). At DMOI4, levels are falling below action stage and the trend is steady. The relatively low QPF from the 1446Z guidance and the 1510Z QPF projections keep the river below action stage. Most of this rivers drainage basin missed the heavier rains the last 2 days. What are your actions for this site?

- A). Issue a River Flood Warning.
- B). Request another round of guidance.
- C). Keep the forecast where it is – no action.
- D). Issue a River Flood Watch.

7). DEMI4. This site has fallen below action stage as its basin also appears to have missed the heaviest rains of the last two days. Available 24 hour QPF loaded guidance does bring the river close to flood stage again tomorrow evening as a result of upcoming rainfall and some response from the prior days light to moderate rainfall. What are your actions for this site?

- A). Issue a River Flood Watch
- B). Issue a River Flood Warning
- C). No action necessary at this time.
- D). Increase the QPF in the RFC guidance.

Quiz #4: June 30, 2014

1). Consider the potential for slow-moving training thunderstorms, with climatologically high PWATS, very saturated soil conditions and low FFG. More convection is developing upstream in the form of a well-organized, but slow-moving MCS. Forecast QPFs are high, and appear reasonable given the existing synoptic and mesoscale situation. It would be appropriate to include all or at least part of the CWA in a Flash Flood Watch.

- A). True.
- B). False.

2). Look at AMEI4. Water levels are still running high. RFC guidance (not shown in AWIPS) takes the site above flood stage by 7 a.m. tomorrow cresting around 13.0 ft. After checking with RFC you feel pretty good about what went into the guidance run. What are your actions for this site?

- A). Issue a River Flood Warning for Moderate Flooding.
- B). Issue a River Flood Warning for Minor Flooding.
- C). No action necessary at this time.
- D). Issue a River Flood Statement for Action Stage.

3). MIWI4. Heavy rain fell upstream of this site as well and the river continues a steady climb. Note the difference between yesterday's 15Z guidance, and today's 01 and 15Z guidance. The most recent data shows a much sharper increase in the river although, even considering today's forecast precipitation it levels off at around 21.5 ft. A River Flood Warning is already in effect for minor flooding for this site. What are your actions for this site?

- A). Upgrade the River Flood Warning "stage" to major flooding.
- B). Continue the Flood Warning for minor flooding.
- C). Drop the River Flood Warning.
- D). No action necessary at this time.

4). Look at CEDI4. Fairly heavy rains impacted much of this rivers upstream drainage basins and the river is continuing to rise as a result. The new RFC guidance which factors in the recent rains and anticipated rains brings the river through moderate flood and to major flood by tomorrow night. What are your actions for this site? Choose all that apply.

- A). Collaborate with the RFC and weigh the confidence of the QPF forecast.
- B). Issue a NOWCast.
- C). Upgrade the flood warning to at least moderate flooding.
- D). Brief EMs/Stakeholders given the large change from 24 hours ago.
- E). Keep the forecast as it was 24 hours ago.
- F). Issue a River Flood Watch.

5). At DESI4, the Des Moines area has seen a bit of a respite from heavy rainfall, but a lot of rain fell over the waters upstream from this site. RFC Guidance brings the location back above flood stage by tonight cresting tomorrow night close to moderate flood stage. What are your actions for this site?

- A). Drop the River Flood Warning.
- B). Continue the River Flood Warning for minor/moderate flooding.
- C). Issue a Flood Watch.
- D). No action necessary at this time.

6). DMOI4. The river continues below action stage, the last few RFC runs keep it close to that level for the coming days, although heavy rain did fall on the streams headwaters about 80 miles upstream. Saylorville Lake Dam releases are expected to fluctuate little. What are your actions for this site?

- A). Keep the forecast at about the same level
- B). Issue a flood warning
- C). Call and ask the dam to release more water
- D). Issue a flood watch
- E). No action necessary at this time.

7). DEMI4. This river is falling this morning, but more rain near the headwaters will likely cause it to rise once again. The latest two runs of guidance bring it above flood stage by tomorrow night. What are your actions for this site?

- A). Consider issuing a River Flood Warning (but don't issue it yet).
- B). Issue a River Flood Warning now.
- B). No action necessary at this time.
- C). Issue a River Flood Watch.

8). Based on your data analysis from today, select the most representative choice to input in the upcoming issuance of the Hazardous Weather Outlook (HWO).

- A). NO HAZARDOUS WEATHER IS EXPECTED AT THIS TIME.
- B). MINOR TO MODERATE RIVER FLOODING WILL OCCUR ALONG PORTIONS OF THE DES MOINES...CEDAR...SOUTH SKUNK...AND IOWA RIVERS MONDAY THROUGH WEDNESDAY.
- C). PERIODIC HEAVY RAIN OVER THE NEXT FEW DAYS MAY CAUSE RIVERS TO RISE TO ACTION STAGE NEXT WEEK.
- D). SIGNIFICANT RIVER FLOODING IS EXPECTED AREAWIDE NEXT WEEK.

Quiz #5: July 1, 2014

1). DESI4. You requested new guidance at 1944Z, but it has rained another inch or so since then. More rain currently falling over the city and the area, where the river flows in to. The river has risen 2 feet since this morning. There is no need to request new RFC guidance at this time.

- A). True.
- B). False.

2). Now AMEI4. This site is rising very rapidly and appears to be about to move above flood stage. The river has risen 3.5 feet since this morning and a foot since 21z. You request a new run of guidance that takes the river to major flood in a few hours, using 6 hour QPF. What are your actions for this site?

- A). Upgrade the flood warning to major flooding.
- B). Wait and see if the river keeps going up.

Quiz #6: July 1, 2014

1). AMEI4. This site made it to major flood with a rapid rise starting to level off right at around 16.0 ft, rising 7.0 ft in 30 hours with its discharge more than tripling. Overlay all of the available RFC forecasts for this site by holding the right mouse button and toggling them on.

- A). Nearly perfect.
- B). Too high.
- C). Too low.
- D). Too low early, more reasonable later.

2). MIWI4. This site marched above flood stage and appears to be making a run at moderate flood. The last available piece of RFC guidance calls for a crest below that. With rainfall over, how confidence are you in forecasting a crest below moderate?

- A). Pretty confident.
- B). Not at all confident.

3). Load the RFC guidance going back to about 14Z on the 25th for MIWI4. Note that through about 15Z on the 30th the river forecast guidance was too low consistently. Why might that be? Choose all that apply.

- A). Bad forecaster.
- B). Too little QPF going to the model.
- C). Errors in the QPF forecast.
- D). Pesticides in the river.

4). Now CEDI4. This location went above moderate flood just before 00z on the July 1st, it continues to rise with the last piece of guidance cresting the site at around 92 ft. Discharge has increased by about 150% since the evening of the 28th. Load the RFC guidance going back to 26/00Z. How did it do?

- A). Too high.
- B). Too low.
- C). Just right.

DamQuiz

1). Waters below dams are always flood controlled and require no special monitoring.

- A). True.
- B). False.

2). If you were on shift, and waters below a dam were rising significantly faster than guidance suggested, what would your action be?

- A). Sit tight wait for the dam operator to and the RFC to call you and inform you.
- B). Contact with the RFC and dam operator to determine the cause of the rise.
- C). Try to forecast the crest on your own, the dam operators are probably too busy.

3). Using a hypothetical scenario, what if the dam had a structural issue but there was no risk of failure. However, the dam operations staff decided to perform an emergency drawdown of the reservoir. The release of water rapidly sends the creek above flood stage, within 2 hours of the release. The creek runs through the west side of town. Based on the map hypothetical flood inundation map you were provided with at the end of the simulation companion, you can see how flooding would likely occur alongside the northern and eastern periphery of the Iowa State University campus and nearby roads, structures, parks, and parking lots. Even though there was no risk of a dam break with catastrophic damage, a Flash Flood Warning could still be issued for impacts downstream.

- A). True.
- B). False.

4). Continuing on this hypothetical path... the current time is 1:30am and the phones and your NWSChat room are quiet. You have not heard anything from the local officials but you are clearly seeing levels at the "fake" AEMI4 below the dam rising rapidly. You are also aware of the potential impacts downstream given this type of rise. Select the best possible act of service that you as an on-duty meteorologist should perform.

- A). Notify the local Emergency Manager/911 center of the rapid change and write a brief informational statement in NWSChat about what you're seeing, in case one of the local TV meteorologists sees it and can help spread the word faster.
- B). No action. You have issued a Flash Flood Warning for the expected area to be impacted. The product will speak for itself.
- C). Notify the local Emergency Manager/911 Operations Center that they need to evacuate the campus grounds.
- D). Call the Iowa State University President at home and inform them that they need to evacuate the campus grounds.