Adopting Higher Regulatory Standards

French Wetmore, CFM
French & Associates, Ltd.
Steilacoom, WA

Chehalis River Basin Flood Authority
Adopting Higher Regulatory Standards

1. Why Go Higher?
2. Higher Standards
3. Getting Them Adopted
Adopting Higher Regulatory Standards

1. Why Go Higher?
   1. NFIP mapping criteria
   2. NFIP regulations
1. Why Go Higher?

1. NFIP mapping criteria
   → Map accuracy trade off with costs
   → 100-year flood standard
   → Map areas already developed or expected to develop
   → Urban: Watershed drains 1 sq. mi.
   → Rural: Watershed drains 10 sq. mi.
1. Why Go Higher?

Current maps neglect:

→ Smaller, local flooding problems
→ Undeveloped areas
→ Potential obstructions to flow
→ Only look at “clear water” flooding
→ Effects of urbanization
→ Changing climate on storm events
→ Changing climate on sea level
1. Why Go Higher?

Hoaquim, City of

The hydrologic and hydraulic analyses for this study were performed by the U.S. Army Corps of Engineers (USACE), Seattle District, for the FIA, under Interagency Agreement No. IAA-H-7-76, Project Order No. 11. This work, which was completed in May 1977, covered all significant flooding sources in the City of Hoquiam (Reference 5).

The following detailed flooding sources were not redefined during the countywide analysis: Bush Creek, Cloquallum Creek (upstream of Cross-Section F), East Fork Wildcat Creek, Newman Creek (upstream of Cross-Section M), Satsop River (upstream of Cross-Section E), Wishkah River, and Wynoochee Creek. These reaches did not have new topographic data available so they were converted/fitted based on the effective FIRMs, new basemap data, and orthophotos.
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1. Why Go Higher?

→ Check Flood Insurance Study
→ Older hydrological data based on short time period – less data to extrapolate and estimate a 100-year discharge
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Sacramento River annual flow volume (millions of acre-feet)
Adopting Higher Regulatory Standards

1. Why Go Higher?

→ Check Flood Insurance Study

→ Older hydrological data based on short time period – less data to extrapolate and estimate a 100-year discharge

→ The period of gage records was dryer than normal

→ Check your gage records – http://water.weather.gov/ahps/
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http://water.weather.gov/ahps/
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http://water.weather.gov/ahps/
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BFE = 142.85 NGVD
Stage = 19.2 ft

The odds are the BFE on your FIRM is too low to protect your community

http://water.weather.gov/ahps/
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1. Why Go Higher?

2. Regulatory standards

→ National standards (not local)
→ Standards on how to build, not incentives to avoid building
→ Can fill and lose flood storage
→ Can increase velocities
→ Can increase flood heights up to one foot on other properties
→ Same standards for critical facilities and hazardous materials as for other buildings
Adopting Higher Regulatory Standards

1. Why Go Higher?

FEMA agrees

→ These are *minimum* standards

→ 44 CFR 60.1(d):

“...regulations adopted by a State or a community which are more restrictive than the criteria set forth in this part are *encouraged and shall take precedence*”

→ FEMA 480 *Desk Reference*

→ Community Rating System
Adopting Higher Regulatory Standards

1. Why Go Higher?
2. Higher Standards
3. Getting Them Adopted
2. Higher Standards

→ 12 recommendations
  → 3 – Mapping standards
  → 4 – Protect others
  → 4 – Protect buildings
  → 1 – Zoning

→ All optional

→ All credited by the CRS
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2. Higher Standards

1. Flood of record
   - Highest recorded flood level
   - 2007 flood map and profiles
   - Future flood level, where higher than BFE

FOR = Stage 20.23 ft
Stage = 19.2 ft
BFE = 142.85 NGVD

http://water.weather.gov/ahps/
Adopting Higher Regulatory Standards

2. Higher Standards

Existing study adopted
In the ordinance

2. Best available data in
Approximate A Zones
Adopting Higher Regulatory Standards

2. Higher Standards

3. No available data in Approximate A Zones

In “Zone A” where the Flood Insurance Rate Map and the Flood Insurance Study do not provide a base flood elevation, the City Engineer shall obtain, review and reasonably utilize any base flood elevation data available from a Federal, State or other source. Where no such data are available, the base flood elevation shall be determined by the City Engineer using an approach approved by the Federal Emergency Management Agency for site-specific flood elevation determinations.
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2. Higher Standards

4. No adverse impact

Diagram showing:
- 100-year (base) floodplain
- Fringe
- Floodway
- BFE + 1 foot
- Channel
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2. Higher Standards

4. No adverse impact

Developer must:

- Certify no more than 1 ft increase
- Map the area affected by increase
- Provide notarized statements from the affected property owners that they do not object.
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2. Higher Standards

5. Filling restrictions

- Prohibit all filling
- Require compensatory storage
- Limited to riverine floodplains

Fill

+ Cheap way to elevate
+ Keeps water away from buildings
+ Can get a LOMR-F
+ Easier for landscaping
- Reduces storage capacity (riverine floodplains)
- Kills native vegetation
- Redirects drainage onto others
- Adversely affects water quality
Adopting Higher Regulatory Standards

2. Higher Standards

6. Critical facilities

- Prohibit from floodplain
- Protect to 500-year flood level
- Keep access during 500-year flood

Sea Bright, New Jersey
Adopting Higher Regulatory Standards

2. Higher Standards

7. Hazardous materials
Adopting Higher Regulatory Standards

2. Higher Standards

7. Hazardous materials
Adopting Higher Regulatory Standards

2. Higher Standards

8. Subdivision Set Asides

- Allow cluster development/PUDs
- Incentives, e.g., transfer of development rights
- Require all lots to have building site out of floodplain (where feasible)
# Adopting Higher Regulatory Standards

## Higher Standards

### Freeboard

<table>
<thead>
<tr>
<th>Zone</th>
<th>Height</th>
<th>Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2 - 4 feet &gt; grade</td>
<td>$1,192</td>
</tr>
<tr>
<td>A</td>
<td>1 foot &gt; grade</td>
<td>$2,277</td>
</tr>
<tr>
<td>A w/BFE</td>
<td>2 or more feet &gt; BFE</td>
<td>$447</td>
</tr>
<tr>
<td>A w/BFE</td>
<td>0 - 1 foot &gt; BFE</td>
<td>$1,583</td>
</tr>
<tr>
<td>AE</td>
<td>3 feet &gt; BFE</td>
<td>$343</td>
</tr>
<tr>
<td>AE</td>
<td>2 feet &gt; BFE</td>
<td>$451</td>
</tr>
<tr>
<td>AE</td>
<td>1 feet &gt; BFE</td>
<td>$748</td>
</tr>
<tr>
<td>AE</td>
<td>At BFE</td>
<td>$1,578</td>
</tr>
</tbody>
</table>

Premiums are for a new single family house, one floor, slab on grade foundation, $100,000 in building coverage, $1,000 deductible, no CRS discount.
Adopting Higher Regulatory Standards
NONCONVERSION AGREEMENT
FOR CERTAIN STRUCTURES IN THE FLOODPLAIN

Whereas, Permit # ________________ has been issued to construct, improve, or repair the property at ___________________________ [address] in the Town of Bucoda, WA, Parcel Number ___________________________; and

Whereas, the permitted building has the lowest habitable floor elevated above the Base Flood Elevation (BFE) of ________ Ft. and the design and construction of the building meets current building code and flood damage prevention ordinance requirements; and

Whereas, as a condition of a Certificate of Occupancy, the owner must agree to not alter the building at a later date so as to violate the building code or flood damage prevention ordinance requirements,

Now, therefore, the undersigned owner of said property hereby agrees to the following:

1. That the enclosed area below the lowest habitable floor shall be used solely for parking of vehicles, limited storage, or access to the building and will never be used for human habitation without first becoming fully compliant with the flood damage prevention ordinance in effect at the time of conversion.

2. That all interior walls, ceilings, and floors below the BFE shall be unfinished or constructed of flood-resistant materials.

3. That mechanical, electrical, or plumbing devices that service the building shall not be installed below the BFE.

4. That the openings in the walls of the enclosed area below the lowest floor shall not be blocked, obstructed, or otherwise altered to reduce the size of the openings or restrict the automatic entry and exit of floodwater.

5. That any variation in construction beyond what is permitted shall constitute a violation of this agreement and the Town of Bucoda Floodplain Ordinance.

6. That the owner and subsequent owners understand that the Town of Bucoda has a right to inspect inside the premises at any time to verify compliance with this agreement.

7. That this Agreement shall be recorded with the Thurston County Auditor so that subsequent owners are made aware of these restrictions.

_________________________________________  _______________________________________
Signature of Property Owner  Witness

Printed name: ___________________________  Printed name: ___________________________
Date: ________________  Date: ________________
2. Higher Standards

10. Non-conversion agreement

- No modifications below the freeboard level that will increase potential damage
- Community can inspect (with advance notification)
- Community will inspect (with advance notification)
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2. Higher Standards

- Sub improvement tracking
  - CRS: Can count either sub improvement or sub damage or both
  - Rolling five years
  - Can start counting from date of ordinance
  - Record keeping is vital
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- **Ag-1 (20 acre lots)**
- **R-1 (1/4 acre lots)**
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2. Higher Standards

12. Low density zoning
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1. Why Go Higher?
2. Higher Standards
3. Getting Them Adopted
3. Getting Them Adopted

1. Explain the problem
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Historic Crests
(1) 20.23 ft on 12/04/2007
(2) 19.98 ft on 02/09/1996
(3) 19.34 ft on 01/10/1990
(4) 18.41 ft on 11/25/1986
(5) 18.39 ft on 12/29/1937
Show More Historic Crests

(P): Preliminary values
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3. Getting Them Adopted

1. Explain the problem
2. Show the benefits
Adopting Higher Regulatory Standards

3. Getting Them Adopted

1. Explain the problem
2. Show the benefits

<table>
<thead>
<tr>
<th>Zone</th>
<th>Height</th>
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<tr>
<td>No BFE</td>
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Premiums are for a new single family house, one floor, slab on grade foundation, $100,000 in building coverage, $1,000 deductible, no CRS discount.
Adopting Higher Regulatory Standards

3. Getting Them Adopted

The Costs & Benefits of Building Higher

Costs of Building Higher

Under the rules of the National Flood Insurance Program, buildings must be protected to the Base Flood Elevation (BFE). Therefore, the cost of freeboard is just the additional cost of building higher than the minimum NFIP standard.

A study conducted by ASFPM in February 2017 estimated the approximate cost of building higher for a 2,000-square foot house. The study assumed the house was constructed to NFIP standards and then estimated the additional cost of building higher than the BFE (see table below).

<table>
<thead>
<tr>
<th>Foundation Type*</th>
<th>Cost per add’t foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete block piers</td>
<td>$990</td>
</tr>
<tr>
<td>Crawlspace with concrete block walls</td>
<td>$1,850</td>
</tr>
<tr>
<td>Crawlspace with poured concrete walls</td>
<td>$2,155</td>
</tr>
<tr>
<td>Stem wall with fill</td>
<td>$2,345</td>
</tr>
<tr>
<td>Fill only</td>
<td>$4,470</td>
</tr>
</tbody>
</table>

Using a house on fill with a stem wall (as illustrated on the cover), here are the average construction costs for building higher:

| Additional cost of construction: | $4,690 |
| Annual flood insurance premium: | $2,147 |
| Annual flood insurance premium built 2 feet above the BFE: | $734 |
| Annual flood premium savings:    | $1,413 |
| Number of years to pay off $4,690 via premium savings: | 3.3 years |
| Added savings realized during a 30-year mortgage: | $37,300* |
### Adopting Higher Regulatory Standards

**Community:** HOQUIAM, CITY OF  
**State:** WASHINGTON  
**County:** GRAYS HARBOR COUNTY ▼  
**CID:** 530061

#### Current CRS Class = 10

<table>
<thead>
<tr>
<th></th>
<th>TOTAL</th>
<th>SFHA *</th>
<th>X-STD/AR/A99 **</th>
<th>PRP ***</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIF</td>
<td>905</td>
<td>896</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>PREMIUM</td>
<td>$1,238,370</td>
<td>$1,233,828</td>
<td>$3,183</td>
<td>$1,359</td>
</tr>
<tr>
<td>AVERAGE PREMIUM</td>
<td>$1,368</td>
<td>$1,377</td>
<td>$637</td>
<td>$340</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CRS Class</th>
<th>Per Policy</th>
<th>Per Community</th>
<th>Per Policy</th>
<th>Per Community</th>
</tr>
</thead>
<tbody>
<tr>
<td>09</td>
<td>$68</td>
<td>$61,851</td>
<td>$69</td>
<td>$61,691</td>
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<tr>
<td>08</td>
<td>$137</td>
<td>$123,542</td>
<td>$138</td>
<td>$123,383</td>
</tr>
<tr>
<td>07</td>
<td>$205</td>
<td>$185,233</td>
<td>$207</td>
<td>$185,074</td>
</tr>
</tbody>
</table>

*“What If” CRS savings – get from ISO/CRS Specialist*
Adopting Higher Regulatory Standards

Improved Floodplain Regulations

While a good start, the NFIP’s minimum criteria will not keep flood losses in the Chehalis River Basin from increasing. Here’s why:

→ The NFIP criteria do not address the entire range of flood problems, only those areas mapped using FEMA’s mapping criteria. For the most part, FIRMs in the Chehalis Basin are based on data from the 1970s.
Adopting Higher Regulatory Standards

The National Flood Insurance Program (NFIP) is a federal program designed to assist homeowners and businesses in reducing the financial burden of flood damage. It provides insurance coverage to property owners in designated flood-prone areas. However, the NFIP has faced criticisms for its lax standards, which have allowed for substantial flood damage in areas that were never intended to be developed.

1. **The community must show on its Flood Insurance Rate Map (FIRM) a 100-year flood level that is lower than the NFIP’s Base Flood Elevation (BFE).**
2. **All development in the 100-year floodplain must be protected with a minimum of 6 feet of fill.**
3. **Development along coastlines must be protected with a minimum of 6 feet of fill.**
4. **New buildings may be allowed in the 100-year floodplain if certain conditions are met.**
5. **Existing buildings may be retrofitted to meet new standards.**

The following standards must be met:

1. **Flood of record:** The flood that occurred in the 100-year flood level.
2. **No available flood data:** The criteria used to determine the flood level must be based on sound engineering principles.
3. **No adverse impact:** New developments should not increase the risk of flooding or exceed the capacity of existing flood control structures.
4. **Filling restrictions:** Filling any portion of the floodplain is prohibited unless approved by the Federal Emergency Management Agency (FEMA).
5. **Freeboard:** New buildings must be designed to withstand a 100-year flood event, including the effects of coastal storms.

Adoption of these standards is crucial for protecting communities from future flood damage. It is recommended that all permit plan reviews, final inspections, and project approvals be conducted by a certified floodplain manager. The CFM must be a community employee, contractor, or circuit rider who helps several communities with floodplain management issues. This administrative measure does not have to be included in the ordinance.

Additional materials are available on the Community Rating System (CRS) website. The table below identifies the community's current score and the dollar savings for different CRS classes:

<table>
<thead>
<tr>
<th>CRS Class</th>
<th>Total</th>
<th>SFHA</th>
<th>X-STD/A99</th>
<th>PHJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5</td>
<td>2,000</td>
<td>1,500</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>3.4</td>
<td>1,900</td>
<td>1,400</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td>3.3</td>
<td>1,800</td>
<td>1,300</td>
<td>300</td>
<td>300</td>
</tr>
</tbody>
</table>

January 9, 2017

NFIP Floodplain Regulations - Hoquiam

It is also recommended that all permit plan reviews, final inspections, and project approvals be conducted by a certified floodplain manager. The CFM should be a community employee, contractor, or circuit rider who helps several communities with floodplain management issues. This administrative measure does not have to be included in the ordinance.

Adoption of these standards is crucial for protecting communities from future flood damage. It is recommended that all permit plans, final inspections, and project approvals be conducted by a certified floodplain manager. The CFM should be a community employee, contractor, or circuit rider who helps several communities with floodplain management issues. This administrative measure does not have to be included in the ordinance.
Adopting Higher Regulatory Standards

3. Getting Them Adopted

1. Explain the problem
2. Show the benefits
3. Make sure staff agrees
4. Work with those affected
5. Improve the ordinance at the same time
Adopting Higher Regulatory Standards

3. Getting Them Adopted

Lowest Floor

Floor Joist

BFE

Foundation

Wall Height

Flood Vent

Crawlspace Interior Grade

OK

Basement

Floor Joist

BFE

Foundation Wall

Wall Height

Flood Vent

Crawlspace Interior Grade

Footings
Adopting Higher Regulatory Standards

3. Getting Them Adopted

✓ Clarify projects that don’t need a floodplain development permit
✓ Consistent standards for all manufactured homes
✓ Small accessory buildings
# Adopting Higher Regulatory Standards

## Status of Adoption of Improved Regulatory Standards – January 31, 2017

<table>
<thead>
<tr>
<th>Recommended Standard</th>
<th>Grays Harbor County</th>
<th>Lewis County</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aberdeen</td>
<td>Cosmopolis</td>
</tr>
<tr>
<td>1 Flood of record</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>2 Best available data</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>3 No available data</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>4 No adverse impact</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>5 Filling restrictions</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>6 Critical facilities</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>7 Hazardous materials</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>8 Subdivision set asides</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>9 Freeboard (3 feet)</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>10 Non-conversion agreements</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>11 Substantial imprv’t tracking</td>
<td>A</td>
<td>A</td>
</tr>
</tbody>
</table>

A = Adopted  
P = Partial adoption  
NR = Not relevant
Adopting Higher Regulatory Standards

1. Why Go Higher?

2. Higher Standards

3. Getting Them Adopted