



KING COUNTY
FLOOD CONTROL
DISTRICT



King County

Preparing for Extraordinary Flood Flow on the Green River in 2009

Presentation to the Advisory Committee
November 19, 2009

Protecting public safety, the regional economy and critical infrastructure.

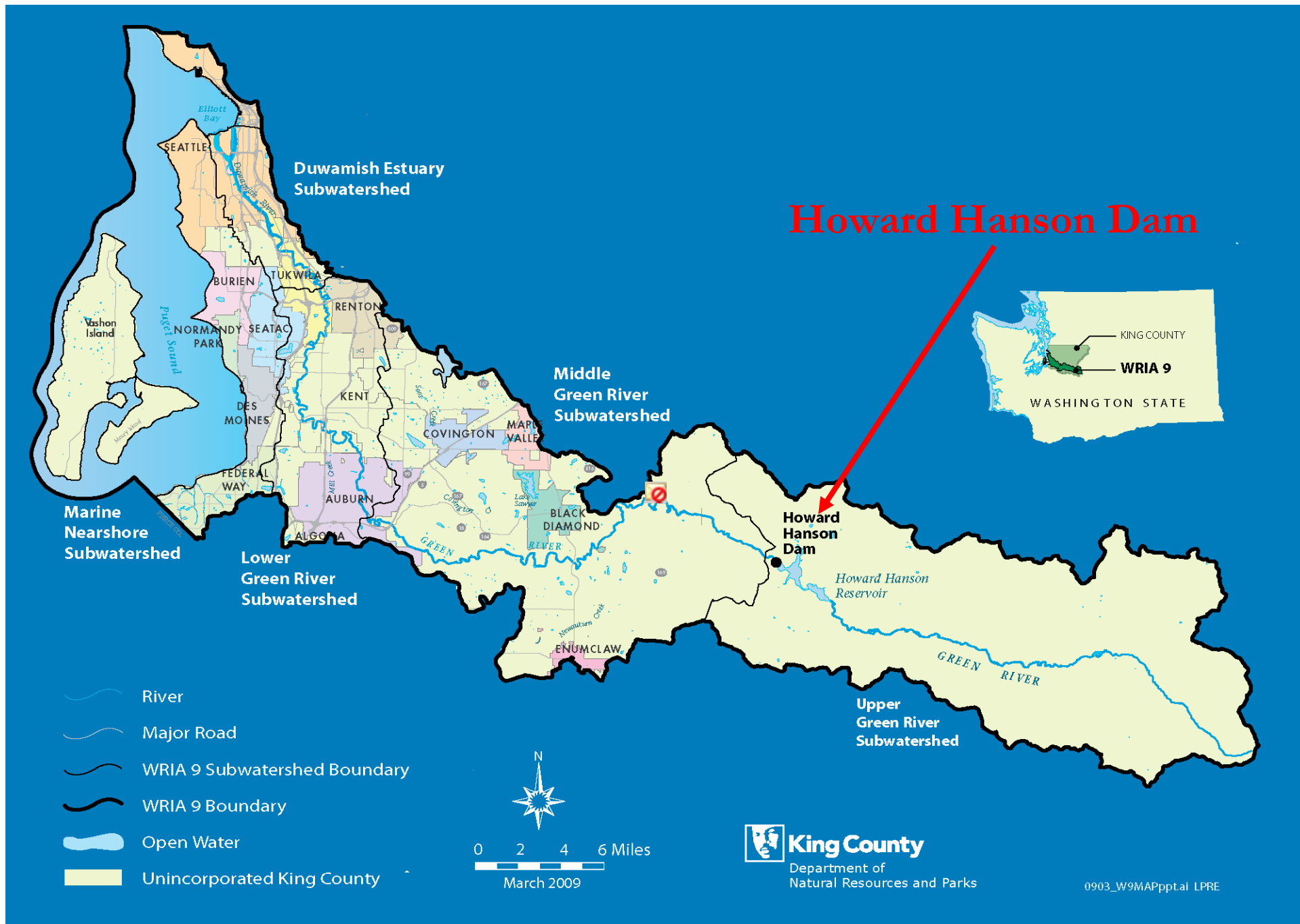
Presentation Overview

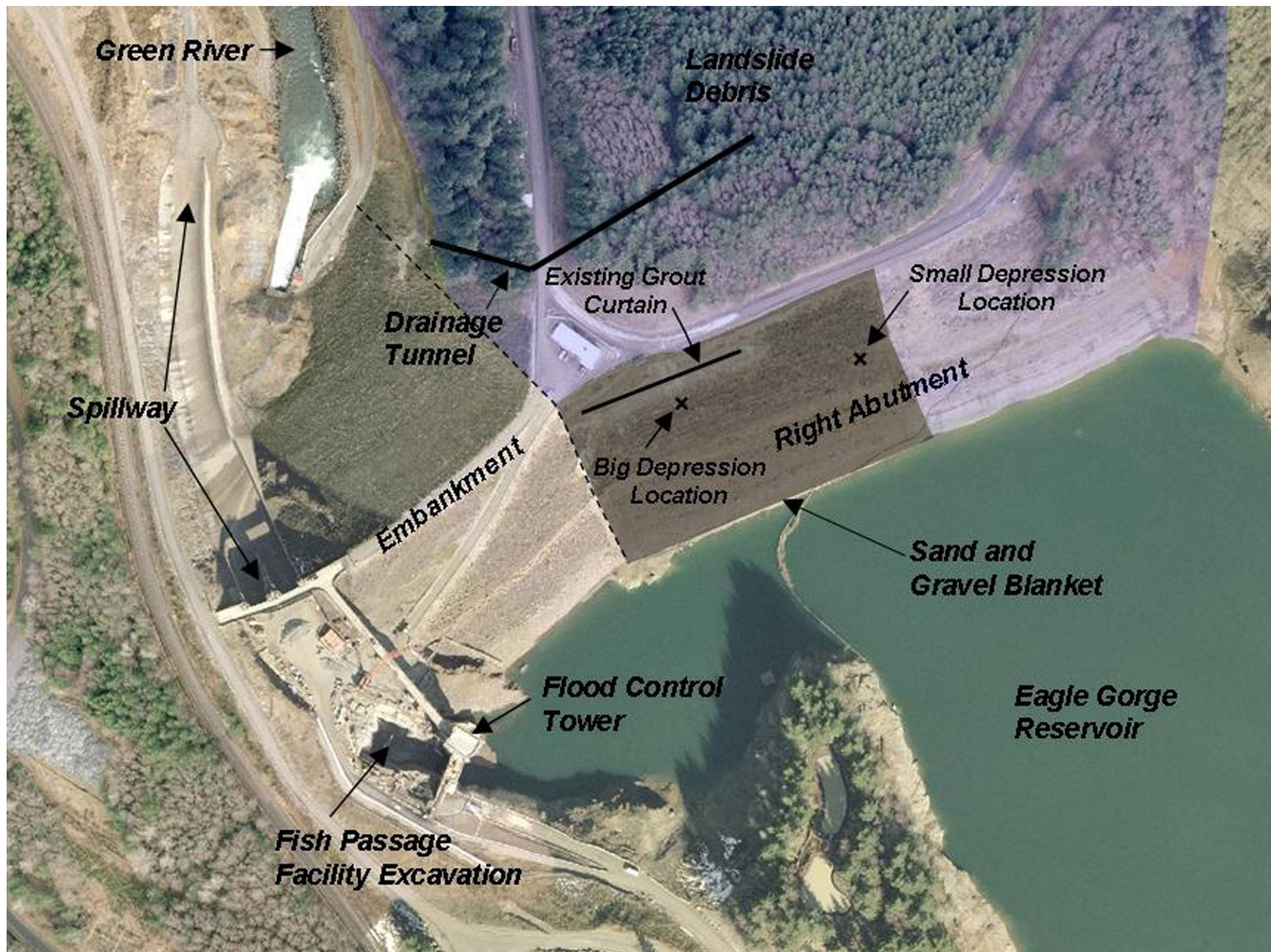
- Overview of Howard Hanson Dam Situation
- Technical Analyses to Develop Temporary Containment Options
- Implementation of Temporary Containment Structures
- FCD Support for Planning, Outreach, and Communications

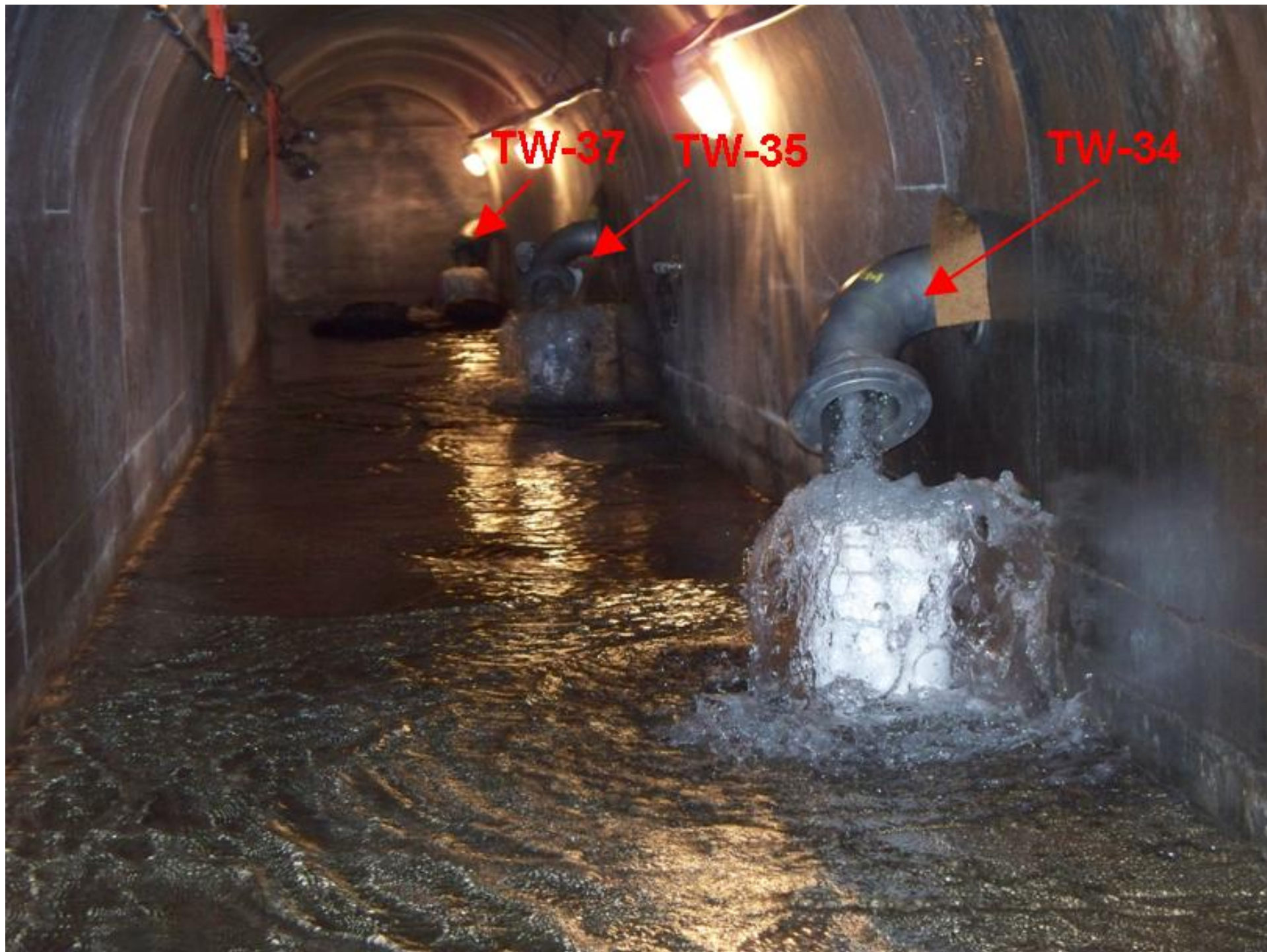
Overview

USACE Howard Hanson Dam

- Howard A. Hanson Dam is a U.S. Army Corps of Engineers flood control dam
- Designed, built, operated and maintained by the U.S. Army Corps of Engineers (operational since 1962)
- Primary purposes are flood control in the winter, fish enhancement in the summer, and water supply







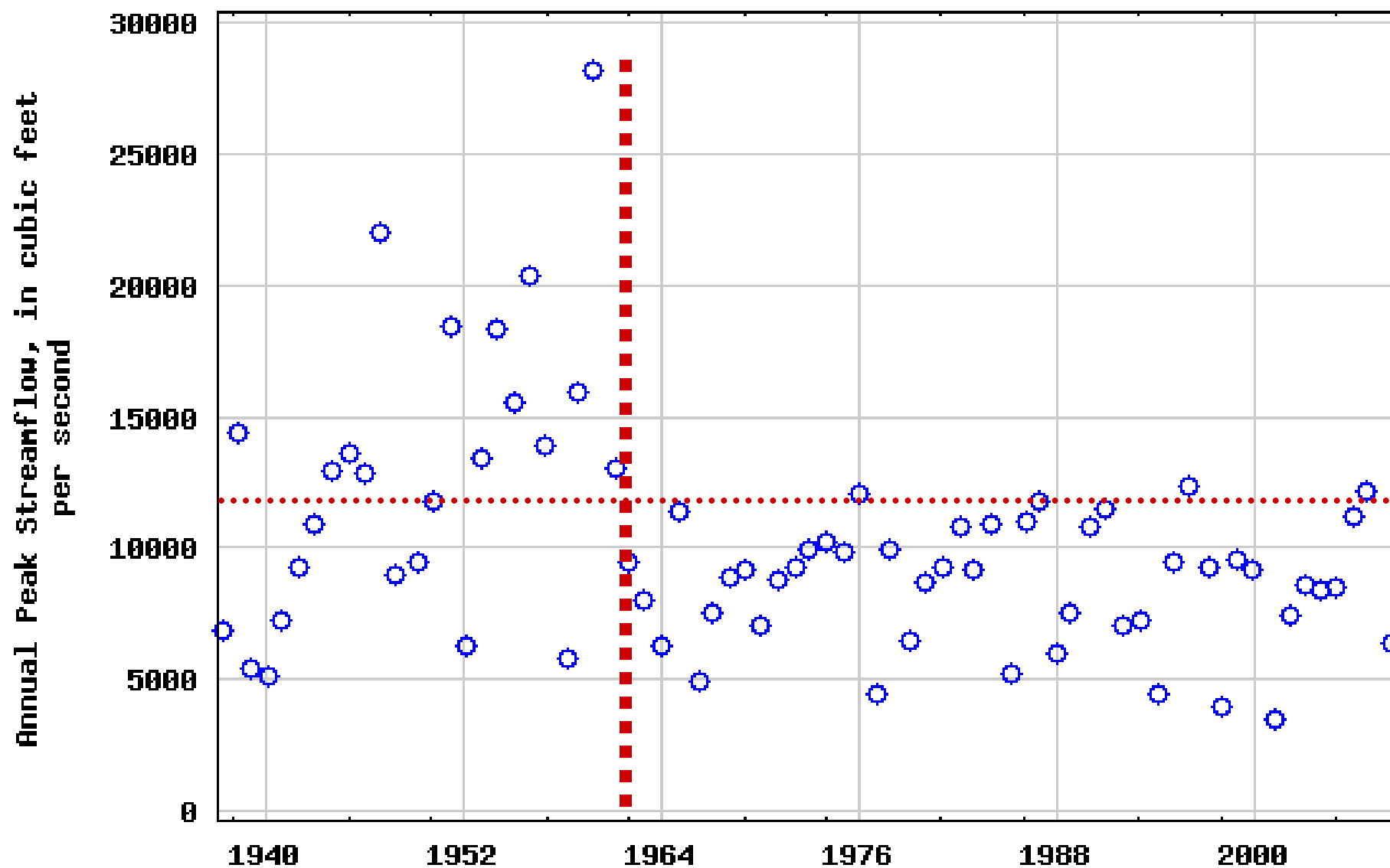


Lower Green River Valley



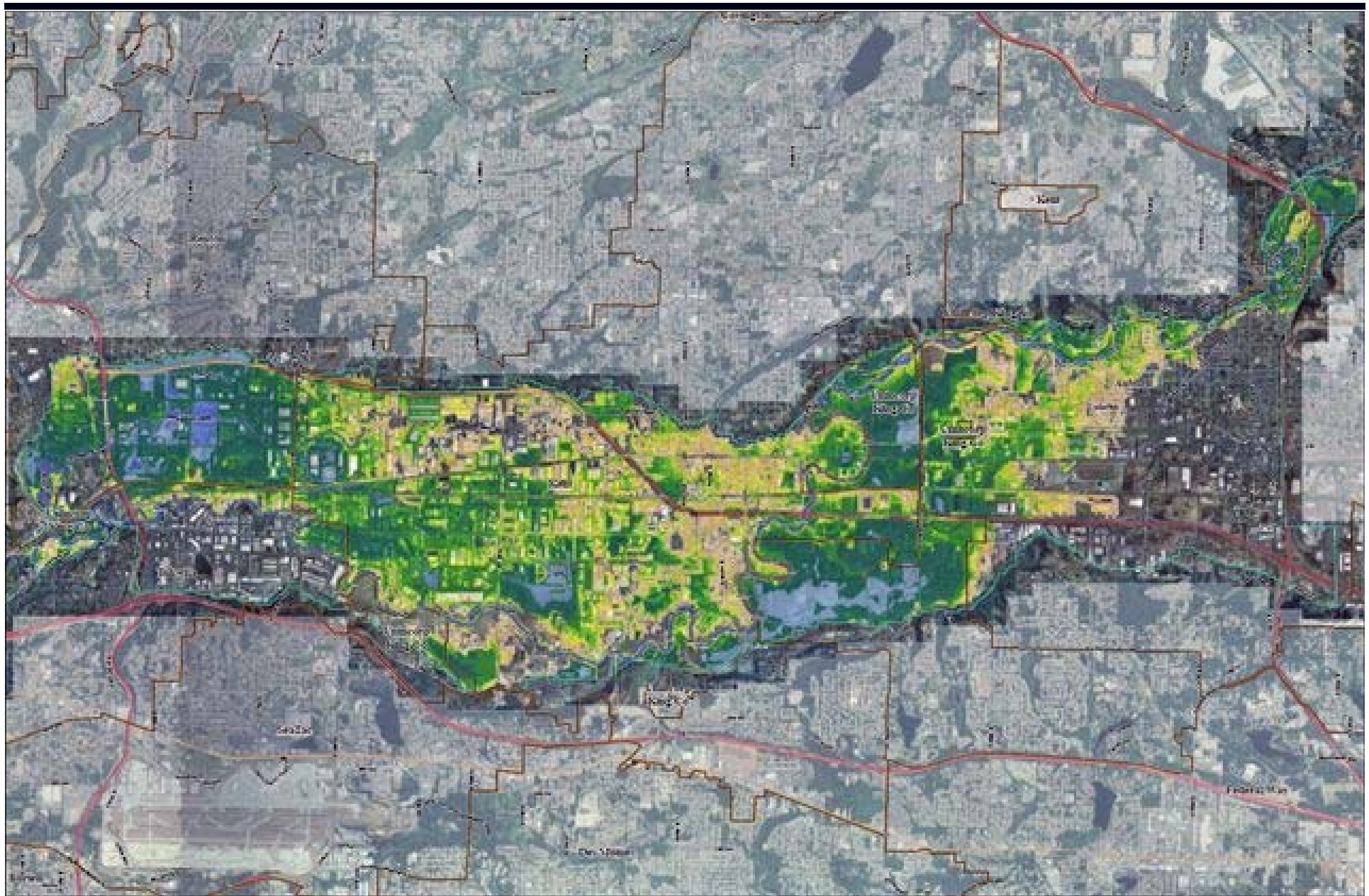


USGS 12113000 GREEN RIVER NEAR AUBURN, WA



Technical Analyses: Identifying Emergency Measures for the Lower Valley

- 2007 - Flood Study and Model
- May 2009 - Inundation Maps (Corps)
- June 2009 - Levee overtopping maps
- August 2009 - Impacts of levee raising on flood elevations
- September 2009 - Levee Stability Geotechnical Analyses
- Active BTC Participation throughout



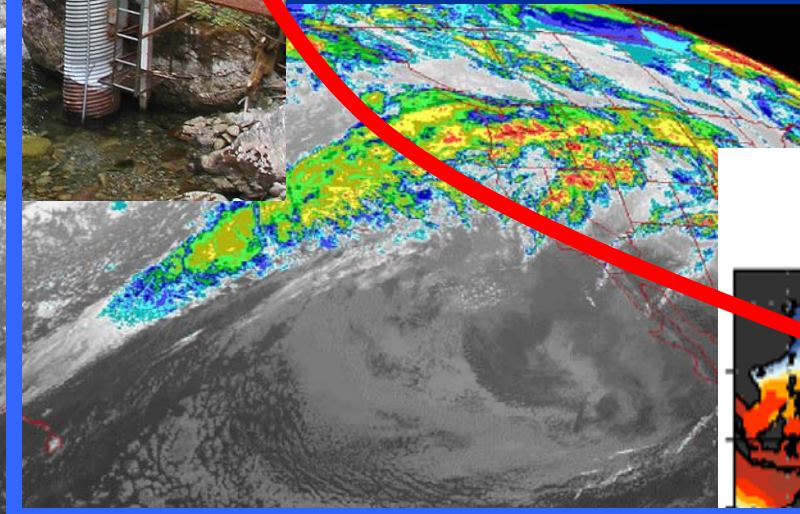
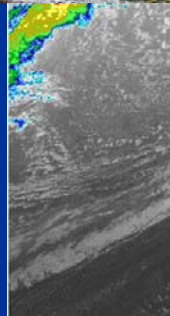
<p>Water Depth Feet</p> <ul style="list-style-type: none"> 0-1 1-2 2-3 3-4 4-5 5-6 6-7 7-8 8-9 9-10 10-11 11-12 12-13 13-14 14-15 15-16 16-17 17-18 18-19 19-20 20-21 21-22 22-23 23-24 24-25 25-26 26-27 27-28 28-29 29-30 30-31 31-32 32-33 33-34 34-35 35-36 36-37 37-38 38-39 39-40 40-41 41-42 42-43 43-44 44-45 45-46 46-47 47-48 48-49 49-50 50-51 51-52 52-53 53-54 54-55 55-56 56-57 57-58 58-59 59-60 60-61 61-62 62-63 63-64 64-65 65-66 66-67 67-68 68-69 69-70 70-71 71-72 72-73 73-74 74-75 75-76 76-77 77-78 78-79 79-80 80-81 81-82 82-83 83-84 84-85 85-86 86-87 87-88 88-89 89-90 90-91 91-92 92-93 93-94 94-95 95-96 96-97 97-98 98-99 99-100 100-101 101-102 102-103 103-104 104-105 105-106 106-107 107-108 108-109 109-110 110-111 111-112 112-113 113-114 114-115 115-116 116-117 117-118 118-119 119-120 120-121 121-122 122-123 123-124 124-125 125-126 126-127 127-128 128-129 129-130 130-131 131-132 132-133 133-134 134-135 135-136 136-137 137-138 138-139 139-140 140-141 141-142 142-143 143-144 144-145 145-146 146-147 147-148 148-149 149-150 150-151 151-152 152-153 153-154 154-155 155-156 156-157 157-158 158-159 159-160 160-161 161-162 162-163 163-164 164-165 165-166 166-167 167-168 168-169 169-170 170-171 171-172 172-173 173-174 174-175 175-176 176-177 177-178 178-179 179-180 180-181 181-182 182-183 183-184 184-185 185-186 186-187 187-188 188-189 189-190 190-191 191-192 192-193 193-194 194-195 195-196 196-197 197-198 198-199 199-200 200-201 201-202 202-203 203-204 204-205 205-206 206-207 207-208 208-209 209-210 210-211 211-212 212-213 213-214 214-215 215-216 216-217 217-218 218-219 219-220 220-221 221-222 222-223 223-224 224-225 225-226 226-227 227-228 228-229 229-230 230-231 231-232 232-233 233-234 234-235 235-236 236-237 237-238 238-239 239-240 240-241 241-242 242-243 243-244 244-245 245-246 246-247 247-248 248-249 249-250 250-251 251-252 252-253 253-254 254-255 255-256 256-257 257-258 258-259 259-260 260-261 261-262 262-263 263-264 264-265 265-266 266-267 267-268 268-269 269-270 270-271 271-272 272-273 273-274 274-275 275-276 276-277 277-278 278-279 279-280 280-281 281-282 282-283 283-284 284-285 285-286 286-287 287-288 288-289 289-290 290-291 291-292 292-293 293-294 294-295 295-296 296-297 297-298 298-299 299-300 300-301 301-302 302-303 303-304 304-305 305-306 306-307 307-308 308-309 309-310 310-311 311-312 312-313 313-314 314-315 315-316 316-317 317-318 318-319 319-320 320-321 321-322 322-323 323-324 324-325 325-326 326-327 327-328 328-329 329-330 330-331 331-332 332-333 333-334 334-335 335-336 336-337 337-338 338-339 339-340 340-341 341-342 342-343 343-344 344-345 345-346 346-347 347-348 348-349 349-350 350-351 351-352 352-353 353-354 354-355 355-356 356-357 357-358 358-359 359-360 360-361 361-362 362-363 363-364 364-365 365-366 366-367 367-368 368-369 369-370 370-371 371-372 372-373 373-374 374-375 375-376 376-377 377-378 378-379 379-380 380-381 381-382 382-383 383-384 384-385 385-386 386-387 387-388 388-389 389-390 390-391 391-392 392-393 393-394 394-395 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770-771 771-772 772-773 773-774 774-775 775-776 776-777 777-778 778-779 779-780 780-781 781-782 782-783 783-784 784-785 785-786 786-787 787-788 788-789 789-790 790-791 791-792 792-793 793-794 794-795 795-796 796-797 797-798 798-799 799-800 800-801 801-802 802-803 803-804 804-805 805-806 806-807 807-808 808-809 809-810 810-811 811-812 812-813 813-814 814-815 815-816 816-817 817-818 818-819 819-820 820-821 821-822 822-823 823-824 824-825 825-826 826-827 827-828 828-829 829-830 830-831 831-832 832-833 833-834 834-835 835-836 836-837 837-838 838-839 839-840 840-841 841-842 842-843 843-844 844-845 845-846 846-847 847-848 848-849 849-850 850-851 851-852 852-853 853-854 854-855 855-856 856-857 857-858 858-859 859-860 860-861 861-862 862-863 863-864 864-865 865-866 866-867 867-868 868-869 869-870 870-871 871-872 872-873 873-874 874-875 875-876 876-877 877-878 878-879 879-880 880-881 881-882 882-883 883-884 884-885 885-886 886-887 887-888 888-889 889-890 890-891 891-892 892-893 893-894 894-895 895-896 896-897 897-898 898-899 899-900 900-901 901-902 902-903 903-904 904-905 905-906 906-907 907-908 908-909 909-910 910-911 911-912 912-913 913-914 914-915 915-916 916-917 917-918 918-919 919-920 920-921 921-922 922-923 923-924 924-925 925-926 926-927 927-928 928-929 929-930 930-931 931-932 932-933 933-934 934-935 935-936 936-937 937-938 938-939 939-940 940-941 941-942 942-943 943-944 944-945 945-946 946-947 947-948 948-949 949-950 950-951
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Maps Reflect Major Assumptions

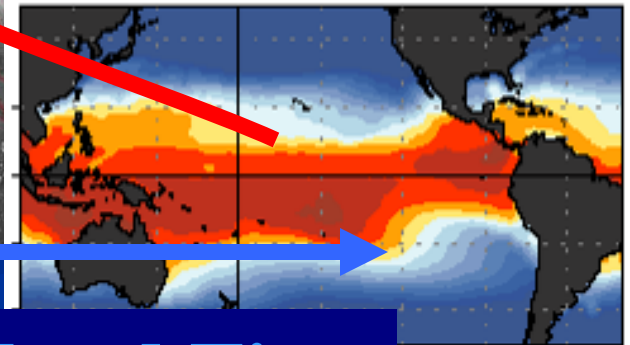
- Inflow to Reservoir
- Performance of Dam
- Local Inflow (below dam)
- Performance of Levee System

Forecast Dilemma

Confidence



EL NIÑO
Jan-Mar 1998



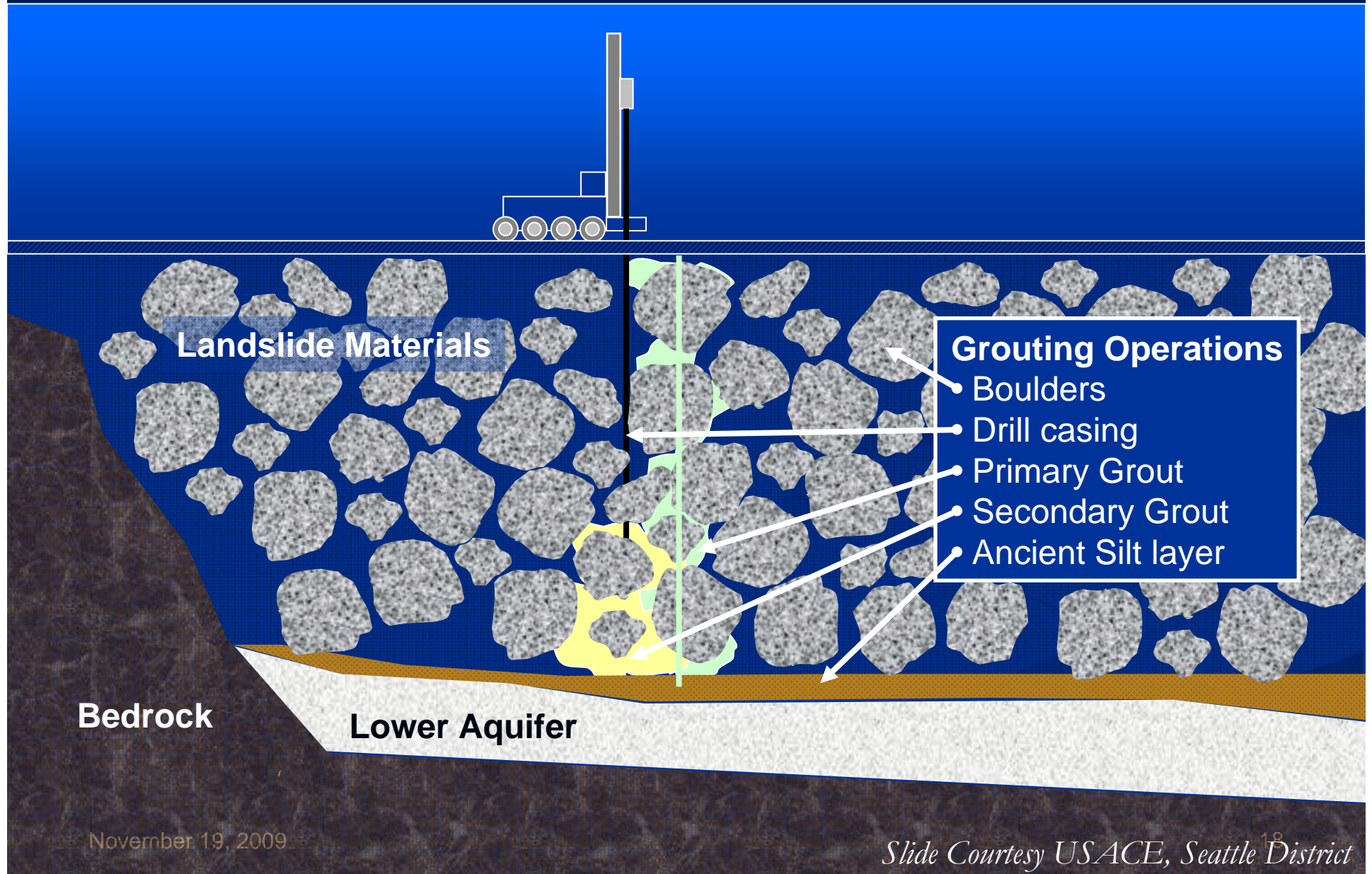
Lead Time

November 19, 2009

Flood Risk Reduction Actions

- HHD Grout Curtain – USACE
- Levee Raising and Pump Stations (\$8.4M)
 - FCD
 - Cities
 - USACE
- Outreach and Communications
- Regional Emergency Response Planning Efforts
- Expert Review of Green River Strategy

USACE Grout Curtain Construction



Examples of Overtopping



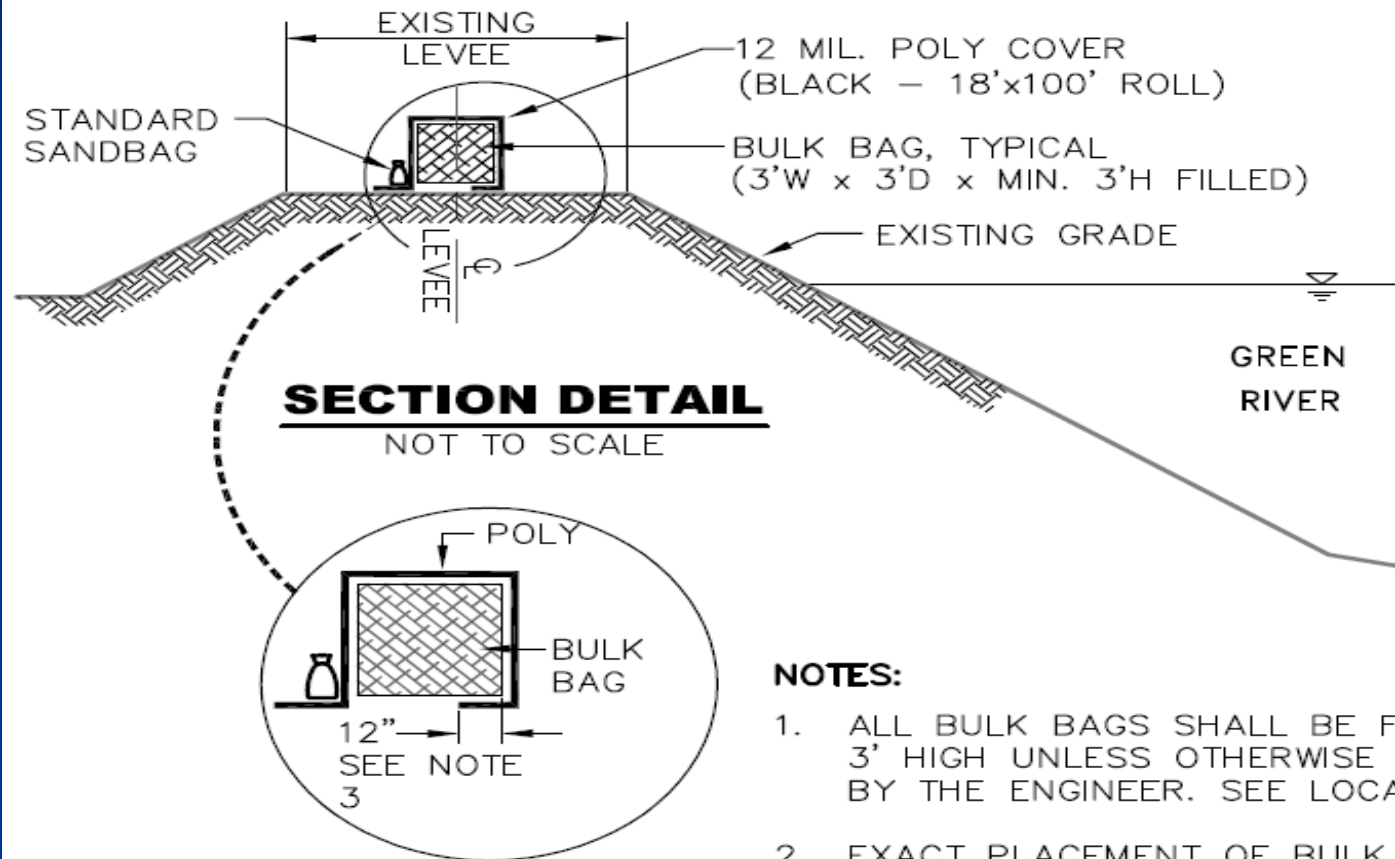
Mason Thorson Extension
Middle Fork Snoqualmie River
Wednesday, January 7, 2009

November 19, 2009



SR 202 Overtopping and
Substantial Damage

Green River Levee Raising



NOTES:

1. ALL BULK BAGS SHALL BE FILLED TO MINIMUM 3' HIGH UNLESS OTHERWISE NOTED OR DIRECTED BY THE ENGINEER. SEE LOCATION MAPS.
2. EXACT PLACEMENT OF BULK BAGS SHALL BE AS DIRECTED IN THE FIELD BY THE ENGINEER.
3. EDGE OF POLY UNDERNEATH BOTTOM BULK BAG SHALL NOT BE MORE THAN 12" FROM OUTSIDE FACE OF THE BAG, AS SHOWN.



Black River Pump Station



- Outlet channel containment
- Electrical generators
- Fuel
- Debris control
- Back-up pumps

Outreach and Planning

- Direct mailings to 170,000 addresses
- Extensive media coverage
- Public meetings, community groups, businesses
- Support for regional preparedness planning

November 19, 2009



Green River Flooding
ARE YOU READY?
Prepare now for a higher risk of flooding

PREPARE NOW

1. Make an emergency plan for your family, pets or livestock.
2. Assemble an emergency kit.
3. Buy flood insurance now – it takes 30 days to take effect. www.floodsmart.gov
4. Get a radio and keep fresh batteries.

IN THE EVENT OF A FLOOD

1. Monitor area news.
2. Move vehicles and equipment to higher ground.
3. Do not walk or drive through standing water or closed roads.
4. Listen for alerts about evacuation notices and routes. Heed evacuation instructions.
5. Bring medications and supplies with you.
6. Relocate animals and livestock, if needed.





 **KING COUNTY FLOOD CONTROL DISTRICT**

 **King County**

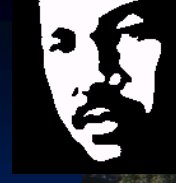
www.kingcounty.gov/floodplans

Expert Review

- Panel of 8 external experts
 - Licensed Engineers, geotechnical experts, floodplain management experts
- Review Green River Flood Risk Reduction Strategy in light of Howard Hanson Dam operational changes
- Recommendations due end of November



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Questions?

