Wildfire Protection Methods Overview: Water / Gels & Foams / Sprinklers / APIRA System

No	Feature	Water	Gels & Foams	Sprinkler Systems	APIRA Wildfire Protection
	1. Human Safety & Evacuation				
1	Risk to human life	High – requires people to stay during danger	High – requires last-minute application	Medium–High – installation/activation requires presence or system readiness	None – deployed early; works without human presence
2	Works during evacuation?	No – must be applied close to fire arrival	No – requires last-minute work	Limited (depends on power, pumps, wind) / Only if water & power remain uninterrupted	Yes – protects & fully effective even if residents evacuated days earlier
3	Requires people to stay on-site?	Yes – very dangerous	Yes – extremely dangerous	Possibly, for activation or adjustments	No — deploys early; no supervision needed
	2. Activation & Reliability				
4	Activation timing	Last-minute only – extremely dangerous	Last-minute only – extremely dangerous	Automated or manual but risk of failure (dependent on sensors, water & power)	Early deployment hours/days before fire - proactive and safe
5	Reliability during evacuation	None	None	Medium (mechanical/pump failure risk)	100% reliable once deployed
6	Wind impact	High – water blown away	High – gel/foams degrade	Very high – water spray misdirected by wind	None – panels are fixed & sealed
7	Effectiveness if residents already evacuated	None	None	Uncertain - Only if water & power remain and system functions correctly	Excellent, Full protection - works independently of people and utilities after deployment
	3. Protection Performance				
8	Can protect if wildfire returns a second time	No – water gone	No – must reapply	No – water usually depleted	Yes - can remain deployed for as long as needed / Yes - reusable many times without loss
9	Protection against embers & firebrands	Weak	Weak after drying	Medium	Very strong – covers every vulnerable point directly - tested protection
10	Protection against radiant heat	Low	Low	Medium	Very High – engineered to be a reflective thermal barrier
11	Protection against direct flame	Very limited	Limited (short exposure)	Limited to medium	High – withstands extreme heat for long durations
12	Coverage reliability	Inconsistent	100% until dry	Good if system works perfectly	100% consistent coverage
13	Duration of protection	Minutes to hours	Few hours until drying	Until water runs out / system fails	Days to weeks - no degradation
14	Wind impact	High – water blown away	High — gels/foams degrade	Very high – spray can be redirected by wind	Low - Unaffected by wind
	4. Dependency & Failure Points				
15	Needs water supply?	100%	100%	100%	No
16	Needs electricity / pumps?	Medium	Medium	High - pumps, valves, motors	No
17	Failure risk (mechanical, pressure loss, empty tanks)	High – evaporation, pressure loss	High – drying, wind	Very High – pump failure, wind deviation, empty tanks	None – passive, stable, sealed protection
	5. Reusability & Environmental Impact				
18	Reusability	No	No (consumables)	No – Limited (once water depleted)	Yes – reusable many times / for years
19	Environmental impact	High – Water waste	High – Chemicals, toxic runoff	Medium – heavy water usage / waste	Zero – no chemicals, no pollution, no water use
20	Maintenance	High	Must be restocked	High (mechanical servicing i.e. pumps, valves, tanks, sensors)	Minimal – store and reuse
	6. Cost Effectiveness				
21	Practical reliability	Low – unreliable in wind	Low–Medium – short lifespan Very poor reliability	Medium–High maintenance	Exceptional – stable, predictable, safe, passive, reliable
22	Long-term cost	High – constant refills	High – consumables	Very high – installation + maintenance	Low – reusable, no consumables